

*Art-Library.*

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Science and Art Department.

EDINBURGH MUSEUM OF SCIENCE AND ART.

CATALOGUE

OF

INDUSTRIAL DEPARTMENT.

ADMISSION FREE,

Wednesdays, from 10 a.m. to 4 p.m.; Fridays and Saturdays,  
from 10 a.m. to 4 p.m., and from 6 to 9 Evening.

ADMISSION SIXPENCE,

Mondays, Tuesdays, and Thursdays, from 10 a.m. to 4 p.m.



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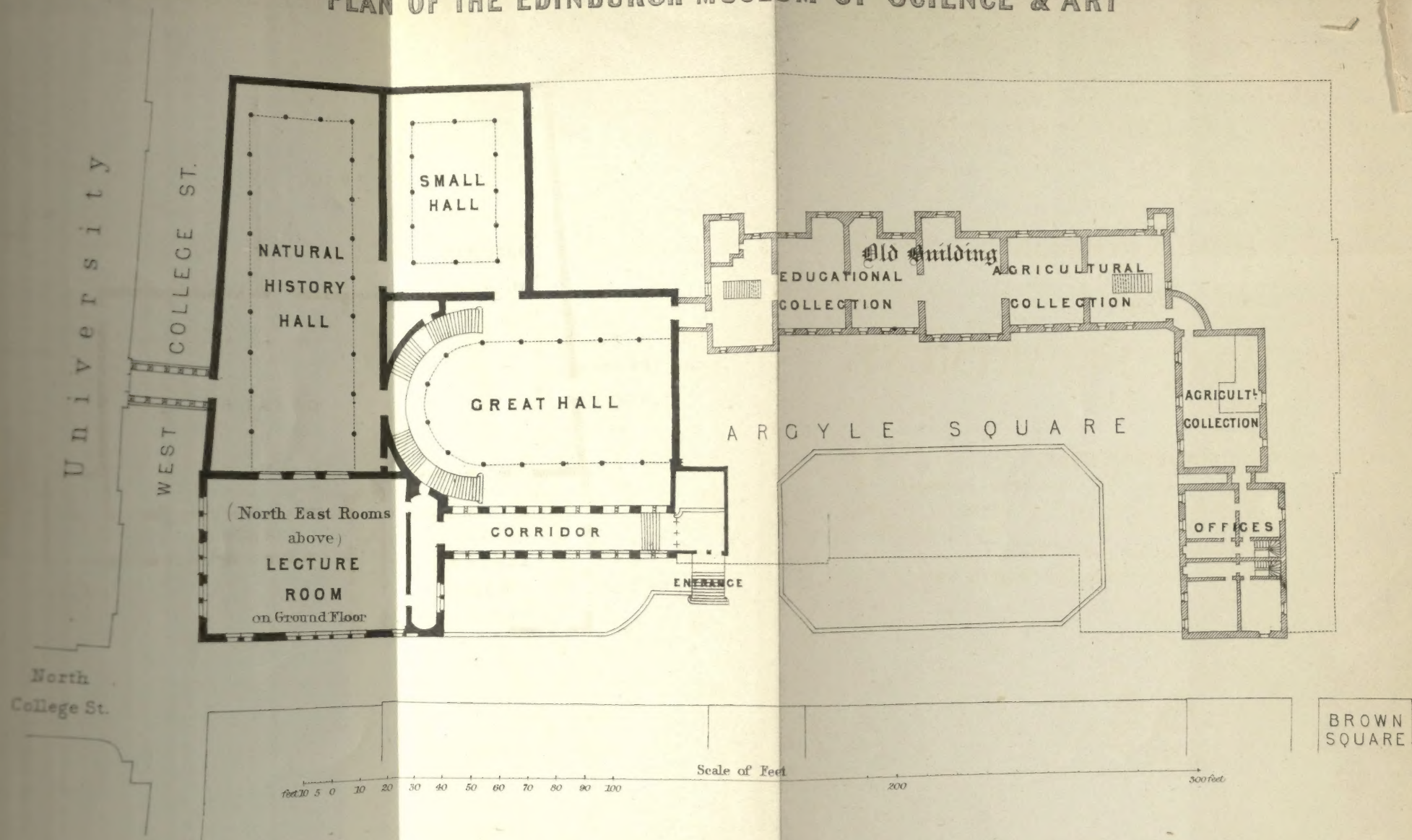
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*20.7.67.*

PRICE SIXPENCE.



# PLAN OF THE EDINBURGH MUSEUM OF SCIENCE & ART



## GREAT HALL

GROUND FLOOR	Architectural and Engineering Models &c.
FIRST GALLERY	Glass, Porcelain.
UPPER GALLERY	Metal Work, Carvings &c.
	Food, Raw Materials &c.

## SMALL HALL

GROUND FLOOR	Processes in Metallurgy.
"	Pottery & Glass, Fuel &c.
FIRST GALLERY	Textile Materials & Models &c.
UPPER GALLERY	Chemical Collection
"	Philosophical Instruments &c.

## NATURAL HISTORY HALL

GROUND FLOOR	General Collection of Mammals and British Collection.
FIRST GALLERY	Birds, Shells, &c.
UPPER GALLERY	Reptiles, Fishes & Invertebrata.
"	Paleontological Collection.

## NORTH EAST ROOM

	Ethnological Collection and Loan Specimens.
UPPER	
NORTH EAST ROOM	Geology and Mineralogy.

N. B. The dotted line shows the extent of the Complete design for the new building.



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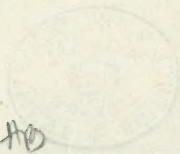
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## PREFACE.

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THE Edinburgh Museum of Science and Art includes two divisions—one of these comprising objects of Natural History, the other objects of Industrial Art. The Natural History Museum was transferred from the University in 1865-66, where it had existed since 1812, and was formed mainly through the exertions of the late Professor Jameson, who held the appointment of Regius Keeper for half a century.

It was not till 1854 that the Industrial Art Department was established, under the name of the Industrial Museum of Scotland. In that year the Government, influenced by memorials from most of the learned societies, public bodies, and representatives of the various industrial and commercial interests of Scotland, determined to institute a Museum in Edinburgh upon the plan of the Museum of Practical Geology in London, but embracing, in addition, the economic products of the animal and vegetable kingdoms. A vote was then taken to buy a site immediately adjoining the University, and the new institution was placed under the direction of the Science and Art Department in London.

In 1855 Professor George Wilson was appointed Director, with a small staff of assistants, who immediately began the collection of specimens. Dr Wilson strove earnestly to interest the public in the new design, and procured many valuable contributions from different parts of the country and from abroad; but his lamented death, in 1859, terminated his exertions in the work which he had so well begun. In the following year Pro-

fessor T. C. Archer of Liverpool was appointed Director, and upon him has fallen the chief labour of filling up the collections, and of organising the new Museum.

The buildings which the Collections at present occupy are partly permanent and partly temporary. The permanent portion is by much the larger, and consists of nearly one-half of what the new edifice is eventually intended to be. Its first stone was laid by the Prince Consort, in October 1861, being the last public act of a life devoted to the cause of popular education. It is built in the style of the Venetian Renaissance, and was designed by the late Captain Fowke, R.E., and executed under the superintendence of Mr Matheson of H.M. Board of Works. The great aim of the architect was to have every part of the Museum well lighted, for which purpose a glass roof with open timber work has been adopted, and the details of the whole structure made as light as was consistent with the necessary strength. Externally the front is constructed of white and red sandstone, and internally a more elaborate kind of coloured decoration has been carried out. The general effect of the building is light, rich, and elegant, but, at the same time, perfectly substantial. In the evenings, when open, it is lighted up by means of horizontal iron rods in the roof, studded with gas burners; and also by pendants, where necessary—the number of jets being in all nearly 5000.

In plan the completed building will consist of one great hall, occupying the greater portion of the front. A series of smaller halls or courts open off this to the back. On the ends of the building there are other two large halls; and there are also a lecture theatre, offices, &c. In each of these halls there are two galleries besides the main floor. The accompanying Ground Plan will show what portion of the design is already built, and a dotted line upon it shows what is further contemplated. The Old Building, which consists of a number of dwelling-houses, connected by openings in the division walls, is also represented on the plan. While the specimens were being arranged in the present buildings, the name was changed by the Lords of the Com-



mittee of Council on Education from the Industrial Museum to that of the Edinburgh Museum of Science and Art; and on the completion of these arrangements, it was formally opened to the public, by His Royal Highness Prince Alfred, on the 19th of May 1866.

The classification which Professor Archer has adopted for the Industrial Department is to a considerable extent provisional. In a collection to which it is still desirable to add largely this must of necessity be so. The peculiar construction of the building has also influenced the arrangements, by requiring that all large and heavy objects should be on the ground floor. Another circumstance, which prevents the placing of some specimens where it would be most desirable, is the want of permanent cases in many sections. For these reasons the existing classification is rather one of convenience than one with any pretension to scientific accuracy. The following statement will sufficiently explain to the visitor what the present arrangements are :—

GREAT HALL.—The *Ground Floor* contains models and specimens connected with Architecture, Civil and Military Engineering, and collateral Arts. The *First Gallery* and *Upper Corridor* contains the specimens which illustrate the history of Glass, Pottery, and Porcelain, Ornamental Metal work, Wood-carving, the application of Mineral, Animal, and Vegetable substances to ornamental purposes, &c. The *Upper Gallery* contains the Food Collection and such raw products as would be inconvenient to exhibit in other parts of the building.

SMALL HALL.—The *Ground Floor* contains models and specimens illustrating Metallurgy and various manufactures from metals in their different stages. The manufacture of Pottery, Glass, and some other mineral substances, are represented here in the same way. A small Fuel series is also shown. The *First Gallery* contains specimens and a few models illustrating the materials and processes of the leading textile manufactures, such as those of Wool, Silk, Cotton, Linen, Hemp, Jute, &c.; Felt, Silk, and Straw Hat-making; Leather, Fur; and also manufactures from Bone, Ivory, Horn, Tortoiseshell, Feathers, Hair, Gut,

India-rubber, Gutta-percha, &c. The *Upper Gallery* contains the collection illustrating Chemistry, the Chemical Arts, Materia Medica, and Philosophical Instruments.

**NORTH-EAST ROOM** (above Lecture Room).—This contains an Ethnological Collection, chiefly arranged in the cases around the walls; and such specimens as are exhibited on loan, of whatever nature.

The **OLD BUILDING** contains a series of Building Stones and Woods used in construction; an Educational Collection, including Books, Maps, Diagrams, and Models, for use in schools; also the manufacture and applications of Paper. But the extensive collection of Agricultural implements and specimens, presented by the Highland and Agricultural Society and the University, occupy the greater portion of the old Museum.

The Catalogue of the Natural History Department, which occupies most of the eastern division of the new building, is in preparation, and will, it is hoped, be issued soon. In the meantime, the visitor will find an indication of its arrangement upon the Plan accompanying this Catalogue.

A. GALLETLY, *Curator*.



# EDINBURGH MUSEUM OF SCIENCE AND ART.

## INDUSTRIAL ART DEPARTMENT.

### OBJECTS IN ENTRANCE CORRIDOR.

Bell's "Daughter of Eve." An electro-deposit in copper, by Messrs Elkington & Co., Birmingham.

Venus and Cupid, a bronzed zinc casting. Prussian.

Bust of the late Robert Stevenson, F.R.S.E., Civil Engineer. By Samuel Joseph, R.S.A.

Large Ornamental Vase, formed of a calcareous deposit from the mineral water of Karlsbad, Bohemia.

The Flooring of the five Compartments in this Corridor, laid with Encaustic, Glazed, and Tesselated Tiles of elaborate design and rich colours, have been executed and presented by the following firms:—

1st and 2d Compartments, by Messrs Minton & Co., Stoke-on-Trent.

3d Compartment (in preparation), by Messrs Maw & Co., Broseley.

4th Compartment, by Mr William Godwin, Hereford.

5th Compartment, by The Architectural Pottery Company, Poole.

### GREAT HALL—Ground Floor.

#### MODELS AND SPECIMENS.

##### *Arranged in Central Portion of Floor.*

Model of the Boerse or Exchange in Berlin, showing the front and one of the ends. It is designed in the classical style of architecture. The Corinthian order, with columns in full relief, is used for the upper part of the building. The lower portion of the front has a colonnade, for which a modification of the Doric order is employed. On the end of the stand a portion of the internal quadrangle is shown; and a portion of the principal frieze, of the real size, is placed under the front of the model.

Lent by the Science and Art Department, London.

Model of St Peter's Cathedral, Rome. This church was begun in 1450, and occupied 176 years in building. Bramante, Michael Angelo, Carlo Maderno, and others, were employed upon it as architects. The front towards the colonnades is 400 feet long and 148 feet high. The dome is 448 feet high.

Lent by the Science and Art Department, London.

Model of St Paul's Cathedral, London. Begun in 1675, and finished in 1711. Designed by Sir Christopher Wren. Length, 500 feet; greatest breadth, 240 feet; height to summit of dome, 365 feet.

Lent by the Science and Art Department, London.

Wrought Iron Screen or Railing. One of the bays or divisions from the Screen placed along the terrace at Hampton Court Palace, the work of Huntington Shaw of Nottingham, blacksmith, about 1695.

Lent by the Science and Art Department, London.

Model of part of the Lattice-Girder Bridge over the River Beelah, Westmoreland.

Lent by the Science and Art Department, London.

Model of the Pacific Steam Navigation Company's Steamers, "Pacific," "Limena," and "Santiago."

Presented by Messrs Randolph, Elder, & Co., Glasgow.

Model of a Roman Galley.

Lent by Mr J. T. Rose, Leith.

Model of an Indian Bazaar, with figures of various castes and professions modelled in clay, from Kishnagur.

Prepared by Sreenani Paul.

Model of a Burmese Bungalow in polished teak wood.

Presented by Mr C. Noel Wilman Begbie, Middle Temple, London.

*One Case contains the following four Models:—*

Model showing the centering used in the construction of Hutcheson Bridge, Glasgow, designed by the late R. Stevenson, F.R.S.E.

Model of a Bridge constructed of laminated ribs, designed in 1830 for the Dornoch Firth, by the late R. Stevenson, F.R.S.E.

Model of the first proposal for a High Level Bridge for Newcastle-on-Tyne, made in the year 1828 for the Corporation of Newcastle, by the late R. Stevenson, F.R.S.E.

Model of Chester Bridge; 200 feet span. Showing the centering used in its construction.

Presented by Messrs D. and T. Stevenson, civil engineers, Edinburgh.

Model of the Bell Rock Lighthouse. Designed and executed by Robert Stevenson, F.R.S.E., F.G.S., &c., Member of the Institute of Civil Engineers.

Presented by the Commissioners of Northern Lighthouses.

Previous to the erection of this lighthouse, the Bell Rock was the scene of many shipwrecks, and in 1797 no fewer than seventy vessels were lost or stranded in avoiding it. The lighthouse was commenced in 1807, and completed in 1811, at a cost of £61,000. The Tower is 100 feet high, 42 feet in



diameter at the base, and 15 feet at the top. The weight of the stonework is upwards of 2000 tons.

The original Models of the Eddystone Lighthouse, made by Mr Smeaton's own hands. Designed and executed by John Smeaton, F.R.S.

Models of Mr Rudyerd's Lighthouse, which stood upon the Eddystone Rocks previous to the erection of Smeaton's structure.

Presented by the Royal Society of Edinburgh.

The first Eddystone Lighthouse was built by Mr Winstanley, in 1696-1700, previous to which the rocks had been the cause of frequent shipwrecks. This structure, which was entirely built of wood, was washed away by a storm in 1703. It was succeeded by Mr Rudyerd's, which was also of wood, but had a base and internal core, reaching to about half its height, of masonry. A fire destroyed this lighthouse in 1755. The present erection was the principal work of the celebrated engineer, Smeaton, and was built in 1757-59. He took the idea of its slightly concave form from the trunk of an oak tree, and this has been more or less adhered to in all the lighthouses which have been built since. The tower is 85 feet high, 27 feet in diameter at the base, and 15 feet at the top. It is built of Portland stone encased in granite.

*Case A.* This case contains specimens of Floor and Wall Tiles. There are one or two examples of Ancient Roman Tiles, some old Wall Tiles from North Berwick Abbey, and a few old Dutch Wall Tiles. Modern Encaustic Tiles are shown in different stages of manufacture, and a large series of finished specimens of these, as well as ornamental Wall Tiles, chiefly by Minton & Co., are likewise exhibited.

*Case B* contains specimens of Ornamental Stones, and includes a series illustrating the operations of the Lapidary; some fine examples of Boxes, &c., made of mossagate; Petrified Wood; Polished Squares, Vases, &c., of Swedish porphyry; a large series of Swiss and Pyrenean Marbles; and Cornish Serpentine. In the upper part of the case there is a Wild Boar and pair of Vases carved in Florence from green serpentine found in the neighbourhood; also some Chinese and Indian Stone Carvings. In the under portion of the case there are specimens of the curious flexible Sandstone of India, contributed by Colonel Seton Guthrie and Major H. C. Johnstone.

*Case C* likewise contains Ornamental Stone-work. The varieties of nephrite or green jade from Siberia, the malachite, the red quartz, and the rhodonite deserve special attention. Among the other objects shown here there are several Tazzi in Derbyshire fluor-spar of different colours, some of black marble inlaid with shell-work; a beautiful Table Top, in the form of a chess-board, of white marble inlaid with jaspers, cornelians, agates, &c., made at Agra, India; a Vase in the so-called Algerian onyx marble, &c.

*Case D* contains specimens of Enamelled Slate; Dutch imitations of Marbles and Ornamental Woods; patterns of French Marquetry or inlaid wood-work; Italian Panel in artificial marble, with bas-relief of the Virgin, &c.

*Case E* contains specimens from the Royal Small Arms Factories,

Enfield, including stages in the manufacture of the Enfield Rifle, which is made up of 61 separate parts, and passes through 732 operations; various Rifles and Carabines, with a Rifle converted into a breach-loader on Snider's principle; Swords, Lances, Cuirasses, &c., regulation patterns.

*Case F. Armourer's Field Forge.*

The specimens in Cases *E* and *F* are presented by Lieutenant-General Peel, Secretary of State for War.

Breech-loading, Rifled, 12-pounder, Armstrong Field Gun; Travelling-Carriage for Field Service with Limber, &c., complete.

Presented by the Secretary of State for War.

The Armstrong Gun is the result of an idea which Sir W. Armstrong suggested in 1854, namely, that of enlarging the ordinary rifle to the standard of a field gun, and using elongated projectiles instead of spherical balls. The gun is made by twisting bars of wrought iron round a steel core, and welding them together when in a state of white heat. Over this tube another cover of twisted bar, but with an opposite turn of the spiral, is put; another, and sometimes a fourth follow, till the requisite strength is obtained. The power of this gun as compared with those formerly in use may be roundly stated thus. For the same weight of projectile the Armstrong gun is only half the weight, requires only half the charge of powder, and sends the shot or shell three times as far.

Case of War Material, containing Shot, Shell, and other Projectiles.

Presented by the Secretary of State for War.

Colonel Hay Campbell's Rifled, Breech-loading, 8-pounder Gun. Made of a Service Brass 6-pounder, lined with a tube of coiled wrought iron, secured by screwing. The Gun Carriage is made of edge plates of iron, alternate with wood. Shot, Cartridge, and Armour Shield.

Lent by Colonel T. Hay Campbell, upon whose plans they are made.

Statue of a Brigand in terra cotta, from Milan.

Statue of a Bacchante in terra cotta, by Andrea Boni, Milan.

NORTH WALL.

Column and Vase of Red Peterhead Granite, by Mr M'Donald of Aberdeen.

Elliptical Septarium Table of Clay Ironstone. The reticulating fissures, filled with calcareous spar, are finely marked in this specimen.

Presented by the Highland and Agricultural Society of Scotland.

Column and Vase of Cornish Serpentine, by the Serpentine Marble Co., London.

Part of an enriched Entablature (architrave and frieze) of a Temple in White Marble, from Milo, Greece.

Presented by Captain Boswall, R.N.

Specimens, illustrating the stages in turning and polishing a Black Marble Pillar.

Presented by Messrs J. & T. Hall, Derby.

Fine specimen of Jasper, partly polished, from Campsie, near Glasgow.



CIRCULAR END OF GREAT HALL.

*North Side.*

Specimens and Tools, illustrating the mode of quarrying Granite, cutting it into paving blocks, and dressing and polishing it. This series was prepared by Mr William Sim, Furnace Quarries, Argyleshire.

Specimens illustrating the manufacture of Artificial Stone, called "Patent Concrete Stone," consisting of the materials used and finished objects, such as Trusses, Balusters, Wall Facings, &c.

Presented by Mr Frederick Ransome, Ipswich.

This artificial stone is prepared by mixing sand and other minerals with a solution of silicate of soda, and bringing the mixture to a plastic condition. It is then saturated with chloride of calcium, which forms an insoluble silicate of lime, and cements the whole into a firm mass.

Series of Architectural Ornaments in Italian terra cotta, consisting of Cornices, Cantilevers, Capitals, Finials, Crockets, Leaf Ornaments, Quatrefoils, Scroll Ornament, Statue, &c.

Presented by Sig. Raffaello Piegaja, Lucca, Italy.

Specimens of Indian Bricks, variously ornamented, and interesting, as showing what can be done in this material by well chosen ornament.

Presented by H.M. Indian Government.

Columns, Capitals, &c., in terra cotta, as used in the construction of the Kensington Museum, London.

Presented by the Science and Art Department, London.

Dutch Paving Tiles, Ornamental Roofing Tiles, and various kinds of Bricks.

Presented by Mr J. F. Tuinhout, Harlingen; Mr A. Van Ingen, Oegstgeest; and Mr J. Gerlings, Utrecht.

Egyptian Sun-dried Brick, having the stamp of Thothmes III. impressed upon its surface, from Thebes.

Presented by Dr J. Ivor Murray.

Brick from the Great Wall of China.

Presented by Captain George Hamilton.

*South Side.*

Two ornamental Chimney Tops, showing the application of enamelled colours to such objects. Chimney Tops, ornamented, but not enamelled. Various architectural objects in Clay, as moulded Copes, moulded Bricks, glazed Bricks, ornamental Ridge Tiles, ornamental Paving Tiles. Capital of pilaster, and piece of architrave with ornament on a ground of enamelled colours.

Presented by Messrs Maw & Co., Broseley.

Ornamental Trusses and Brackets, executed in Fire-clay.

Presented by Messrs Harriman & Co., Blaydon-on-Tyne.

Red Kiln Tiles, and Red and White Suffolk Pantiles.  
Presented by Mr C. O. Fison, Stowmarket, Suffolk.

Patent "Stone Bricks," made chiefly of sand and lime.  
Presented by Messrs Bodmer Brothers, Newport, Monmouthshire.

Various Bricks made of Fire-clay, as common, bull head, compass, arch, soap fire, and round nose bricks.  
Presented by Messrs Gibbs and Canning, Tamworth.

Bricks, Kiln Tiles, and Ridge Tiles, made at Dalkeith.  
Presented by His Grace the Duke of Buccleuch.

Circular Architectural Ornament, showing the application of colour to Portland Cement for external decoration.  
Presented by Mr W. J. Taylor, London.

Illustrations of the manufacture of Portland Cement. Figure of a Spread Eagle in the same material. Piece of Concrete, composed of one part of cement powder to five of stone chippings.  
Presented by Messrs I. C. Johnson, & Co., Gateshead.

Portland Cement is composed of carbonate of lime and clay fused and pulverised.

Section of a Bed or Seam of Fire-clay, from Stourbridge, thickness 2 feet 6 inches. Gas Retort, made of Stourbridge clay.  
Presented by Messrs King Brothers, Stourbridge.

Chalk Pit Products, consisting of chalk used for making mortar, flint, sand, and other minerals found in the chalk beds.  
Presented by Messrs Meeson & Co., Grays, Essex.

Cast-Iron Fountain, bronzed. Cupid holding a water jar. Made by Barbezat & Co., Val d'Osne, France.

Cast-Iron Fountain, bronzed. Boy sitting on a water jar. By same makers.

#### SOUTH WALL.

Side of a Drawing Room with Decorations, consisting of panels in imitation of inlaid marbles, malachite, &c. By C. Moxon, London.  
The chimney piece and glass frame by the late John Thomas.  
Lent by Messrs C. and J. Moxon, 63 George Street, Edinburgh.

Ornamental Panels, in imitation of stamped leather, for wall decoration.

Two Casts from Carved Oak Panels. French, of the time of Louis XVI. (Hung on model of lattice bridge.)  
Presented by Mr John Moxon, 63 George Street, Edinburgh.

Two Pictures for wall decoration, as specimens of block printing. French.

Presented by Mr George Dobie, 23 George Street, Edinburgh.

Examples of Parquetry Flooring.

Presented by Messrs A. J. Arrowsmith & Co., 80 New Bond Street, London.

Austrian Table Top of inlaid veneer-work.



Case containing specimens illustrating the manufacture of Paper-Hangings, including the colours and other materials used ; and also two Blocks and a Roller employed in printing the papers.

Presented by Mr William Cooke, Grove Works, Leeds.

Specimen of a highly decorated Wall-Paper.

Presented by Messrs Jeffrey & Co., 115 Whitechapel, London.

Window and Frame made of blue gum wood, Victoria.

Presented by the Colonial Commissioner for Victoria, International Exhibition of 1862.

## WEST (TEMPORARY) WALL.

Casts of Architectural Ornaments, designed for internal decoration of villas.

Presented by Mr John Davidson, Hawick.

Ornamental Chimney Piece, with panel for mirror, life-sized statues, &c., in Carton pierre. Compartment of a Ceiling. Greek Torchere. Medallion, with hawk and rabbit surprised by a polecat. Panel Ornaments, Cornices, Enriched Mouldings, &c., in the same material.

Presented by Messrs G. Jackson & Son, 49 Rathbone Street, London.

Frame containing specimens of Scagliola. This is an ornamental plaster-work, made with a groundwork of calcined gypsum mixed with glue, and laid upon lath or brickwork. It is then bestudded while soft with chips (scagliole) of spar, granite, marble, alabaster, &c. The surface is finished by polishing.

Presented by Messrs Bellman and Ivey, London.

Frames of Encaustic and Enamelled Tiles, for floor and wall decoration.

Presented by Messrs Maw & Co., Broseley, Shropshire.

Enamelled Slate, in imitation of granite, porphyry, and marble.

Made by Messrs Field & Allan, Edinburgh.

Series of Roofing Slates of the different sizes in ordinary use, from the Welsh Slate Company's Quarry at Festiniog, Merionethshire.

Presented by H.M. Commissioners of the Great Exhibition of 1851.

Roofing Slates of different colours, from Lethnab Quarry, Brechin, Forfarshire.

Presented by Mr Alex. Mitchell, lessee of the Quarry.

Ridge Pieces for Roofs, formed of Welsh slates.

Presented by Messrs Williams & Co., Port Madoc.

Series of Drain Pipes, and Fittings connected with them, in salt-glazed stoneware.

Presented by Messrs Gibb & Canning, Tamworth.

Dutch Drain Pipes of various sizes, and other articles for sanitary purposes.

Presented by Messrs Cremer & Co., Bolsward, Holland.

*On Upper Portion of West Wall.*

Specimens of Gobelins and Beauvais Tapestry, with the following subjects:—

- "Lycurgus proclaiming his infant nephew Charilaus King of Sparta." By N. Poussin. Gobelins.
- "Don Quixote attacking the Puppet Show." Beauvais.
- "Esther and Ahasuerus." By Dutroy, Rome, 1737; Gobelins, 1772.
- "Tobit's Restoration to Sight." By Domenichino. Gobelins, 1772.
- "Jacob pleading with Laban for his daughter Rachel." Gobelins, 1772.

Lent by Mr Charles Moxon, 18 Brook Street, London.

The celebrated tapestry manufactory of the Gobelins in Paris was constituted a royal establishment in 1667, and is still carried on by the French Government. Its looms have produced many beautiful pictorial works, which are highly valued. The modern productions are distributed as imperial presents. Eminent artists have always been engaged on the designs, and some of the best French chemists have directed its dye-works. Beauvais is also famous for its peculiar tapestry, although a minor establishment.

**SMALL HALL.****METALLURGICAL SPECIMENS.****No. 1 WALL CASE ON NORTH SIDE—GROUND FLOOR.***Compartment A, B, C, D, E, F,*

Contain a large series of specimens illustrating the Varieties of Iron Ore, the stages in the Smelting of Cast Iron, and the processes of converting it into Malleable Iron. There are also shown some of the more noted kinds of Iron and Steel.

The following are the principal Ores of Iron, all of which are represented in this series:—

1. Magnetic Iron Ore, magnetic Oxide of Iron, or Magnetite; contains when pure 72½ per cent. of iron.
2. Red Hematite, Red Iron Ore, or Anhydrous Sesquioxide of Iron; contains, when pure, 70 cent. of iron.
3. Brown Hematite, Brown Iron Ore, or Hydrated Sesquioxide of Iron; contains, when pure, 60 per cent. of iron.
4. Spathic Carbonate, Sparry Iron Ore, or crystallised Carbonate of Iron; contains, when pure, 48 per cent. of iron.
5. Argillaceous Iron Ores, as Clay-band Ironstone, Black-band Ironstone, &c. These are essentially mixtures of carbonate of iron with clay, but in the case of black-band with earthy matter also. The iron manufactured in Great Britain is chiefly obtained from these ores, which usually contain about 30 per cent. of metallic iron.

Among the contributors to the Iron Series are the following:—

- Mr Murray, Monkland Iron and Steel Works, near Glasgow.
- Mr John Fogg, Kinnell Ironworks, Bo'ness, Linlithgowshire.
- Mr J. B. Fogg, Dundyran Iron Works, near Glasgow.
- Messrs Hird, Dawson, & Hardy, Lowmoor Iron-Works, Yorkshire.



## METALLURGICAL SPECIMENS.

The Lowmoor is, perhaps, the most valuable British iron. Its excellence is illustrated by the specimens of rods tied in the cold state into knots, without showing any appearance of fracture.

The Farnley Iron-Works, near Leeds, through the Leeds Chamber of Commerce.

The iron produced at these Works is similar to the Lowmoor.

Messrs Losh, Wilson, and Bell, Newcastle-on-Tyne.

Messrs Gilkes, Wilson, Pease, & Co., Middlesbro'-on-Tees, whose specimens are shown in an isolated case.

This firm has sent a case of iron specimens made from the remarkable oolitic ironstone of the Cleveland district (Yorkshire), which was discovered so recently as 1847, and now producing 400,000 tons of iron annually.

The Parkside Mining Company. Whitehaven Hæmatite Iron Ore.

Messrs Naylor, Vickers, & Co., Sheffield. Specimens of Steel made from various kinds of bar iron.

Baron Rostaing, Paris. Specimens of Steel made from cast iron by granulating it in a centrifugal machine to oxidise the carbon.

Baron Wahrendorff, Skeptsa, and Mr Charles Oestberg, Osterly, Sweden. Specimens of Swedish Magnetic Iron Ore, and Iron and Steel made from it.

Mr Robert Chambers, Edinburgh. North American Iron Ores and Specimens of Iron.

The Russian Commission of the International Exhibition of 1862.

The specimens of Russian sheet iron shown are of remarkably fine quality. They were made from magnetic ore.

## ON TOP OF WALL-CASE.

Specimens illustrating the manufacture of Tin Plates and Terne Plates. Presented by Messrs Townshend, Wood, & Co., Swansea.

## NO. 1 WALL CASE, NORTH SIDE.

*Compartments G, H.*

Series of specimens illustrating the Smelting of Lead Ore from Wanlockhead, Dumfriesshire. The method of extracting the silver from the lead by slow crystallisation is also illustrated.

Presented by His Grace the Duke of Buccleuch, through Mr Stewart, manager of the Wanlockhead Lead Works.

Similar series of specimens from Allenheads in Northumberland, where the Lead Works form one of the largest mining establishments in the world.

Presented by Mr W. B. Beaumont, M.P., through Mr Thomas Sopwith, F.G.S.

Specimens illustrating the Dressing and Smelting of Lead Ore, and Extraction of Silver, from Freiberg, Saxony.

Sulphuret of lead, or galena, is the chief ore of the metal, but some is also obtained from the native carbonate of lead (cerussite). Some of the rarer lead minerals, such as the phosphate, arseniate, and chromate of lead, from Leadhills, are also shown. These were contributed by Mr George Vere Irving, of Newton House, near Leadhills, and Mr W. Muir, of Leith.

## METALLURGICAL SPECIMENS.

*Compartments I and J.*

Specimens illustrating Copper Smelting from Pyrites (sulphuret of iron and copper).

Presented by Messrs Evans and M'Bryde, St Helens.

It has become the practice within the last few years to smelt pyrites, containing even as little as 2 per cent. of copper after the sulphur has been burned out of the mineral, for the manufacture of sulphuric acid.

Similar series of specimens from the Widdington Copper Works, near Newcastle.

Presented by the Jarrow Chemical Company.

Specimens, illustrating the manufacture of Copper, from the Bogoslovsky Copper Works, Government of Perm, Russia.

Presented by the Russian Commission of the International Exhibition of 1892.

Ingot of Welsh, Spanish, Russian, and Japanese Copper.

Presented by H.M. Commissioners of the Great Exhibition of 1851.

Series of Copper Ores from the celebrated Burra Burra Mines in Australia.

Presented by the Rev. Alex. Russell, Adelaide.

Sheet Copper and Brass, from the Works of St Juan, Albacete, Spain.

Specimens, illustrating the manner of obtaining Copper by Precipitation, from a solution of the metal termed the "Cementation Process."

Presented by the Spanish Commission for the International Exhibition of 1882.

Iron Hook, encrusted with deposited copper.

Presented by H.M. Commissioners of the Great Exhibition of 1851.

Copper is often found native, some specimens of which are exhibited.

The uses of copper are numerous, but the following are those of most importance, and are all shown except the black oxide:—

1. Red Oxide of Copper; contains, when pure, 69 per cent. of copper and 11 of oxygen. This rock ore is found in greatest quantity in Australia.
2. Black Oxide of Copper; contains, when pure, 80 per cent. of copper. Occurs at Lake Superior, in North America.
3. Green Carbonate of Copper or Malachite; contains, when pure, 57 per cent. of copper. Found in all copper mines, but not often in large quantities. It is largely imported from Australia.
4. Blue Carbonate of Copper; contains, when pure, 55 per cent. of copper. Not so abundant as the green carbonate, but often found in admixture with it.
5. Copper Pyrites, Yellow Copper Ore, Sulphuret of Copper; contains, when pure, 35 per cent. of copper. This is the most abundant ore of copper and the only one found in quantity in Cornwall and Devonshire, where its average produce is about 12 per cent.

Purple Copper and Gray Copper Ore are also Sulphurets of Copper. There is a large specimen of the latter from Cornwall on a separate pedestal, presented by H.M. Commissioners of the Great Exhibition of 1851.



METALLURGICAL SPECIMENS.

*Compartment K.*

Specimens, illustrating the Smelting of Tin.

Presented by Messrs R. R. Michell & Co., Cornwall.

Specimens, illustrating the Dressing of Tin Ores and the Separation of Tungsten from Tin Ore, by Oxland's process.

Sent from the Museum of Practical Geology by Mr Trenham Reeks.

Specimens of Spanish Tin, and Malacca and Banca Tin, from various donors.

Series of specimens, showing the varieties of Tinstone, Lodestone, and accompanying Rocks, from the Cornish Tin Mines.

Presented by Messrs J. Higgs & Son, Penzance.

The only ore of tin of importance is the binocide (tinstone), containing, when pure, 78 per cent. of tin. The Cornish Tin Mines are by far the most productive in the world.

IN FRONT OF NORTH WALL CASE.

Desk Case, containing illustrations of the Smelting of Zinc, including specimens of the metals in plates, granulated, rolled into sheet, and in thick pieces, showing the laminated form of crystallisation. Also specimens of Lead Pipes lined with silver to prevent corrosion by water.

Presented by Messrs A. Courage & Co., Bagilt, Flintshire.

Zinc is obtained chiefly from two ores—1. Sulphuret of zinc, zinc blende, or black-jack, containing, when pure, 67 per cent. of zinc; and 2. Carbonate of zinc or calamine, containing, when pure, 52 per cent. of the metal. In North America a small quantity of zinc is obtained from the oxide of zinc (red zinc ore) and the silicate of zinc.

ON TOP OF NO. 1 WALL CASE.

Sheet Zinc for roofing, and Corrugated Sheet Iron for roofing, coated with zinc (galvanised).

Presented by Messrs F. Braby & Co., London.

NO. 1 WALL CASE, NORTH SIDE.

*Compartment K.*

Specimens of Nickel Ore (sulphuret of iron and nickel), from a mine near Inverary, Argyleshire.

Presented by His Grace the Duke of Argyll.

Specimens of Mixed Cobalt and Nickel Ores, chiefly arsenides of cobalt and nickel, from Hungary and Chili. Also Regulus of Nickel and Cobalt, Speise, and Crystallised Slags.

Presented by Mr David Forbes, F.G.S., Birmingham.

Metallic Nickel.

## METALLURGICAL SPECIMENS.

Crystals of Cobalt Ore (arsenide of cobalt), Washed Cobalt, and Oxide of Cobalt, from Tunaberg Cobalt Works, Sweden.

Presented by H.M. Commissioners of the Great Exhibition of 1851.

*Compartment L.*

Series of specimens, illustrating the manufacture of Aluminium from Bauxite, a ferruginous mineral, containing 30 per cent. of alumina. Also specimens of Aluminium Bronze. This series includes a finely crystallised specimen of Sodium.

Presented by Messrs Bell Brothers, Newcastle-upon-Tyne.

Aluminium is a metal new to the arts since 1855. It can be obtained from any substance containing alumina (oxide of aluminium), such as clay, for example. Bauxite, the ore now used, is obtained in France. It is ground and mixed with soda ash, by which an aluminate of soda is obtained. From this pure alumina is procured by mixing it with carbonic acid. By special treatment of the alumina with common salt, charcoal, and chlorine gas, a double chloride of aluminium and sodium is formed. When the double chloride is mixed with pure sodium and heated with fluxes in a furnace, the metallic aluminium is set free and falls to the bottom.

Aluminium is remarkable for its lightness and non-liability to tarnish in the air; but its chief use in the arts is to form an alloy with copper, called aluminium-bronze. This substance possesses the appearance of gold, with almost the hardness of iron.

Metallic Thallium and Dust from the iron pyrites furnace, from which it is prepared.

Presented by Messrs Bell Brothers, Newcastle.

Specimens, illustrating the Smelting of Antimony.

Presented by Messrs G. Hallett & Co., 52 Broadwall, Blackfriars, London.

Fine Block of Crystallised Antimony, smelted in Cornwall.

Presented by Mr Thomas Cay, 5 Circus Place, Edinburgh.

Specimens of Sulphuret of Antimony, from the Antimony Mine, Knipe Hill, Ayrshire.

Presented by Mr B. N. Peach, Geological Survey of Great Britain.

Specimens of Purified Sulphuret of Antimony, "crude antimony."

Presented by Mr Hawkins, Liverpool.

Spanish Antimony.

Presented by H.M. Commissioners of the Great Exhibition of 1851.

Antimony is always reduced from the sulphuret, which is its chief ore. The native sulphuret is freed from its impurities by roasting it with charcoal, and it then forms the crude antimony of commerce. To get the metal pure the purified sulphuret is reduced to powder, again roasted, and finally made into paste with a charcoal and carbonate of soda, from which the antimony is reduced in crucibles.

Antimony is not used alone in the arts, but is employed with other metals as an alloy in forming type metal, Britannia metal, &c. It communicates hardness to these.

Metallic Arsenic.

Presented by Messrs Balkwill & Co., Plymouth.



METALLURGICAL SPECIMENS.

Metallic Bismuth.

This metal is generally found native; it is employed to communicate fusibility to those metals with which it is alloyed.

Block, Sheet, and Rod of Cadmium, from Poland.

Presented by the Russian Commission of the International Exhibition of 1862.

This metal is found in nature as a sulphuret of cadmium, accompanying zinc in its ores. It is usually obtained as a collateral product in the smelting of zinc. Cadmium is scarcely used in the arts, but it possesses some valuable properties, as malleability, ductility, and not being easily tarnished by the atmosphere.

Fine specimen of Pyrolusite or Black Oxide of Manganese, from Huelva, Spain.

Presented by the Spanish Commission of the International Exhibition of 1862.

Fine specimen of native Bismuth, containing gold.

Lent by Mr Alfred Evans, Birmingham.

*Compartment M.*

Native Cinnabar, Sulphuret of Mercury, in powder, from Mine of Levigliani, Tuscany.

Presented by H.M. Commissioners of the Great Exhibition of 1851.

Native Cinnabar, from Spain.

Presented by the Spanish Commission of the International Exhibition of 1862.

Native Cinnabar, from California.

Presented by Professor Archer.

Metallic Mercury or Quicksilver.

This metal is generally obtained from the sulphuret (Cinnabar) by burning off the sulphur and distilling the mercury. Artificially prepared sulphuret of mercury forms the red pigment vermilion.—*See Chemical series.*

Native Silver, in a rocky matrix, from Lima.

Presented by Professor Archer.

Native Silver in a vein of carbonate of lime, from El manto del Colio, Chili.

Red Silver Ore, Sulphuret of Silver and Antimony, from Chili.

Presented by Mr Chancellor.

Fine specimens of native silver are shown in the Mineralogical Collection of the Natural History Division.

Native Platinum in conglomerate, from Paolo-Anatoliskaya Mine, near Taguil, Ural Mountains.

Presented by Colonel Nefedyer, of the School of Mines, St Petersburg.

Native Platinum.

Spongy Platinum.

Russian Platinum Coins.

## METALLURGICAL SPECIMENS.

Platinum is the heaviest metal known. From its great infusibility and power of resisting chemical re-agents, it is of great service as a material for making chemical vessels. Platinum is about five times more valuable than silver.

Series of specimens illustrating the Washing Process employed for the gold-bearing sands at Kazansk Diggings, Government of Perm, Russia. This sand, before washing, contains 1 per cent. of gold.

Plan of the open Gold Works of Logov, and of the Tools employed in the gold washings of Logov and Bogoslov, Russia.

Plans and Sections of the Underground Works of the Kazan Gold Mine on the Crown lands of Bogoslov, Russia.

Plans and Section of the Gold Washing Machinery of the Gold Mine at Pessherno, Russia.

(These drawings are placed on the top of the case.)

Presented by the Russian Commission of the International Exhibition of 1862.

Auriferous Quartz, containing about 20 oz. of gold to the ton, from Steiglitz, Victoria.

Presented by the Victorian Commissioners of the International Exhibition of 1862.

Model of the "Welcome" Gold Nugget, found 11th June 1858, at Bakery Hill, Ballarat, Australia. Weight, 2166 oz.; value, £8376, 10s. 10d. It is now melted, but was the largest gold nugget ever found.

Model of a beautifully crystallised Gold Nugget, found at Mount M'Ivor, Victoria, on the 1st May 1853. Weight, 23 oz. 9 dwt.

Presented by the Museum of Practical Geology, London, through Mr Trenham Reeks.

Model of a Gold Nugget found on the estate of William Elder, Esq., at Kuruc-a-Rue, Rokewood, near Geelong, Victoria. Weight, 162 oz.

Model of a Gold Nugget found at the same place. Weight, 50 oz.

Presented by Mr William Elder, Rokewood, near Geelong, Victoria.

Auriferous Wash Dirt or Drift, from the Castlemaine district, and from the Royal Saxon Gold Mining Company, Victoria.

Presented by the Victorian Commissioners of the International Exhibition of 1862.

*In front of North Wall Case the following large specimens of Ores are shown on pedestals:—*

Hæmatite, Black-band, and Spathose Iron Ores.

Galena, or Sulphuret of Lead.

Sulphuret of Antimony and Grey Copper Ore.

Also a specimen of Rolled Armour Plate.

Manufactured and presented by Messrs John Brown & Co., Sheffield.

Case containing specimens of Platinum and vessels made of it; of the rare metal Iridium; of the elementary substance Boron; and of the metals Aluminium, Magnesium, Silver, and Gold. Also specimens of Metallic Salts and Oxides used in the arts.

Lent by Messrs Johnson, Matthey, & Co., Hatton Garden Works, London.



## MINING AND METALLURGICAL MODELS.

*Arranged in Central Portion of Small Hall.*

## Large Model of an Iron Blast Furnace,

Showing an arrangement for using the unconsumed gases generated by the furnace to heat the steam boilers and hot air pipes (incomplete). Made by the Sirhowey Iron Company. Presented by H.M. Commissioners of the Great Exhibition of 1851.

*Table N.*

## Model of a Converting or Cementation Furnace for the manufacture of Steel.

It is made to dissect, in order to show the internal chests or troughs, arrangement of flues, &c. The chests, which are situated in the centre of the cone at its base, are filled with charcoal dust and bar iron, arranged in alternate layers. A properly regulated heat is maintained in the furnace for six or eight days, when the iron by the absorption of carbon has been converted into "blister steel." Steel is merely iron with from half to one and a half per cent. of carbon.—*See Specimens of Steel in No. 1 Wall Case, Compartment F.*

## Model of Casting House for preparing cast steel.

Here the blister steel is melted into fire-clay crucibles (seen on a small scale in the inside of the model, and of the real size on the table adjoining it), and cast into ingots. The ingot moulds and tools used are shown in the case beside the steel specimens.

## Model of Hearth for heating steel to be worked at forges.

## Model of Sheet Furnace for heating steel to be worked at the rolling mill.

*Table M.*

## Model of Rolling Mill for the manufacture of steel into sheets, bars, rods, &amp;c., of various kinds. Also Model of Tilt Hammers for the manufacture of tilted steel.

The preceding five models, connected with the manufacture of steel, were constructed by Messrs Naylor, Vickers, & Co., Sheffield.

*In a separate Case.*

## Model of the "Red Mine," Freiberg, Saxony.

This model shows the method of mining those minerals, such as lead, copper, and tin ores, which occur in veins or lodes as distinguished from minerals which occur in beds, such as coal, and some kinds of ironstone. One side of the model shows the shaft, including the arrangement for raising the ore, the pumps, and the "man-engine," which has been introduced of late years into deep mines to save the miners the labour of descending and ascending by ladders. All these are worked by water-wheels, which are also shown. Another side of the model shows the lode or ore-vein being worked out at several places.

*In a separate Case.*

## Model of an Ore Crushing Mill,

Showing an improved arrangement by which ores, such as those of lead or copper, are raised by waggons to a platform, crushed by rollers, sifted by sieves immediately below them, and the larger pieces of the crushed ore raised again to the platform by a bucket-wheel, to be crushed anew.

*Upright Table Case I.*

Model of an Ordinary Stamping Machine, for stamping ore.

Model of a Mill for Grinding Ore on the principle of a flour mill. It has also a sieve, for sifting the pulverised ore.

Model of a Separating Drum, for sifting pulverised ore.

Model of a Sieve Machine, for separating ground ores into different degrees of firmness.

Model of a Hydraulic Sieve Machine, for washing and separating impurities from ore.

Model of an ordinary Sieve Machine, for washing and separating impurities from ore.

Model of a Percussion Table, for washing pulverised ore.

Model of a Jigging Table, for washing pulverised ore.

*Upright Table Case K.*

Model of a "Flame" Furnace. A form of reverberatory furnace for smelting lead ore.

Model of an English Furnace used at Freiberg, for roasting Copper Ore.

This is another form of reverberatory furnace.

Model of a Silver Extraction Work.

In this apparatus the roasted silver ore is digested in a strong warm solution of sea-salt in the iron cistern over the furnace to obtain a solution of chloride of silver. This is allowed to cool in the descending series of tubs, into the lower of which metallic copper is introduced, which has the property of decomposing the chloride of silver and precipitating metallic silver.—*See Specimens in No. 1 Wall Case, Compartments G. and H.*

Model of an Amalgamation Work.

This apparatus is used for separating silver from poor ores by means of mercury. The silver in the ore is first converted into a chloride by roasting with common salt. The roasted ore is introduced along with quicksilver into the oak barrels, which are then made to revolve with a slow motion for about a day. An amalgam of silver and mercury is then formed, which collects in the chamber at the lower part of the model.

Model of Retort and Furnace, used for distilling off the mercury from the silver in the amalgam.

Model of a Cupel Hearth for separating silver from lead in which the original percentage of silver has been greatly increased by the crystallisation of the lead. On this hearth the lead is oxidised, and blown off as litharge by means of bellows.

Model of a Silver Refining Furnace.

*Upright Table Case L.*

Model of a Furnace for roasting Ore.

Model of a Double Shaft Furnace, for the recovery of lead from the litharge.

The preceding nineteen models are all connected with the mining and smelting of argentiferous lead ore and copper ore by the German method, and were constructed by Herr Carl Schumann, model master, Freiberg Mining School.



Complete working Model of Jones and Levick's Coal-Mining Machine.  
Lent by Messrs Levick & Simpson, Blaina Iron-Works, Newport,  
Monmouthshire.

Model of Grinding and Polishing Machinery used by lapidaries.  
Constructed by Mr Gavin Young, Edinburgh.

## METAL WORK—PROCESSES OF MANUFACTURE, &c.

### NO. 2 WALL CASE—EAST SIDE.

#### *Compartment N.*

Specimens illustrating the manufacture of Edge Tools.

Presented by Messrs Turton & Sons, Sheffield.

Series of Tools used by various Trades, and for Agricultural purposes.

Presented by Messrs J. Yates & Son, Birmingham.

#### *Compartment O.*

Specimens illustrating the manufacture of Steel Wire, Spiral Springs,  
Wool Combs, Hackles, Gills, &c.

Specimens of Shoemakers', Sadlers', and Upholsterers' Tools; and  
Carpenters' Gimlets.

Presented by Mr J. C. Wynn, Birmingham.

Holdfast Pliers, Pincer Pliers, and Holdfast Vice on a new principle.

Presented by the Rev. J. Brodie, Monimail, Fife.

Card of specimens, illustrating the stages in the manufacture of a  
Steel Watch-Key.

Presented by Messrs James Heeley and Son, Mount Street, Bir-  
mingham.

Russian Steel Axe.

Presented by the Russian Commission for the International Exhi-  
bition of 1862.

Various kinds of Saws, manufactured by Messrs Taylor Brothers,  
Sheffield.

Presented by H.M. Commissioners of the Great Exhibition of 1851.

Japanese Saw.

#### *Compartment P.*

Specimens illustrating the manufacture of Files and Chisels.

Presented by Messrs Harrison Brothers and Howson, Sheffield.

Various kinds of Files and Edge Tools, manufactured by Messrs Cocker  
and Son, Sheffield.

Presented by H.M. Commissioners of the Great Exhibition of 1851.

Specimens showing the successive stages in the manufacture of a Table  
Knife and Fork, Pocket Knife, and Bastard File.

Presented by Mr J. Atkinson, Sheffield.

Stages in the manufacture of a Steel Chisel.

Presented by Messrs T. Turner and Co., Sheffield.

## No. 2 WALL CASE—EAST SIDE.

Knives, Forks, and Scissors of Cast Iron, which is subsequently converted into Steel.

Presented by Mr A. Bryson, F.R.S.E.

Specimens of Wrought-Iron Nails and Spikes.

Presented by Messrs Halket and Bates, Gateshead-upon-Tyne.

Specimens of Old Locomotive Boiler-Plates, showing the wearing of the plates at the joints, which always takes place; accompanied by specimens of Patent Thick-edged Boiler-Plate, intended to rectify such wearing.

Presented by Messrs Alton and Fernie, Derby.

Model of Trotman's Anchor, used on board H.M. yacht "Victoria and Albert."

Presented by Mr J. Trotman, London.

Swedish Harpoon.

Chain of Bent Nails prepared for the manufacture of a Sword Blade.

Presented by the Spanish Commission for the International Exhibition of 1862.

*Compartment Q.*

Successive stages in the manufacture of a Tinned Iron Basin.

This small vessel, 6 inches diameter by  $2\frac{1}{2}$  inches deep, requires sixteen blows from the hammer of the stamping machine before it is formed. It is then cleaned with acid and tinned.

Illustrations of the manufacture of a Block-Tin Teapot, Candlestick, and Swing Lamp.

Stages in the manufacture of a Tinned Iron Dish-Cover.

The stamping process by which these objects are formed out of a single piece of sheet iron was patented by Mr Thomas Griffiths of Birmingham in 1841, and has greatly improved and extended the manufacture of this kind of goods.

Specimens showing the stages in coating the surface of a Stamped Iron Basin with a vitreous Enamel, which is afterwards printed with a pattern. All the above series in this compartment are

Presented by Messrs Griffiths and Browett, Birmingham.

Specimens illustrating the manufacture of Tinman's Knobs and Japanned Knobs.

Presented by Mr Thomas Yates, Birmingham.

Specimens of Iron Wire, Nails, Tube Bowl, &c., coated by fusion of granulated brass.

Presented by Mr E. Heeley, Birmingham.

*Compartment R.*

Specimens of Brass Tubing, Stop-cock, Ball-cocks, &c., manufactured by Messrs Everitt and Son, Birmingham, and Messrs Guest and Chrimes, Rotherham.

Presented by H.M. Commissioners of the Great Exhibition of 1851.



## No. 2 WALL CASE—EAST SIDE.

Specimen showing the process of drawing a Seamless Brass Tube for a locomotive boiler.

Presented by The Stephenson Metal Tube and Copper Roller Co., Birmingham.

Specimens of Wire and Wire-Cloth in Iron, Copper, and Brass, for Paper-making Machines, Flour and Rice dressing Machines, &c.

Presented by H.M. Commissioners of the Great Exhibition of 1851.

Stamped Brass Pans, used for preparing and serving food on the West Coast of Africa, &c.

Presented by Messrs Griffiths and Browett, Birmingham.

Copper Cooking Pans, made for the Egyptian Market, by Messrs Griffiths and Browett.

*Compartment S.*

Specimens illustrating the manufacture of a Pocket Flask, Cruet Stand, &c., from Britannia Metal, chiefly by pressure in metal moulds.

Britannia metal is an alloy of brass, tin, antimony, and bismuth.

Presented by Mr Thomas Yates, Birmingham.

Specimens illustrating the stages in the manufacture of a Britannia Metal Tea-pot, produced by the process of spinning on a lathe, engraved and electroplated; Tea-pot Body, ornamented by die-pressing; Coffee-pot Body, fluted by die-pressing; Jug, partly embossed; Pottery Jug with Plated Cover, counterpoised so as to open of itself when the water is poured out.

Presented by Mr William Spurrier, Birmingham.

Series of Perforated Zinc Ornaments, and Frame of the same painted in different colours. (On top of case.)

Presented by Messrs F. Braby and Co., London.

Frame of Ornamental Pateras in Zinc.

Specimens of the various kinds of Lead Shot.

Presented by Messrs Lock and Blackett, Newcastle-upon-Tyne.

Various specimens of Lead Pipes, corroded by contact with soil, bitten by rats, and containing incrustations.

Presented by Messrs Hay and Addis, Edinburgh.

Lead Pipes and portions of Lead Linings of Cisterns, corroded by the action of hard water.

Sections of Pipes protected from the action of water, beer, &c., by linings of tin, gum-resins, india-rubber, &c.

Presented by Dr Lauder Lindsay, Perth.

*Compartment T.*

Specimens and Drawings illustrating the stages in the production of a German Silver Wine Cooler. The body is formed out of one piece by hammering, the foot is spun on the lathe, and the mountings are partly stamped in dies and partly cast from patterns.

Presented by Messrs Cartwright and Woodward, Birmingham.

## No. 2 WALL CASE—EAST SIDE.

Stages in the manufacture of a German Silver Spoon.

Presented by Messrs J. Yates & Sons, Birmingham.

Specimens of German Silver Lasso Rings.

Presented by Mr Thomas Yates, Birmingham.

Specimens to illustrate the manufacture of a German Silver Tea-pot.

Presented by Messrs Martin, Hall, & Co., Sheffield.

German silver is an alloy of nickel, copper, and zinc.

Specimens of Plated and Gilt Brooches, called "gilt toys."

Specimens of Copper and German Silver Spoons, electroplated with silver.

Presented by Messrs Ratcliffe & Co., Birmingham.

Page of Lieut.-Col. Shortrede's Traverse-Table, electroplated in copper by Messrs W. Blackwood & Sons.

Presented by Messrs W. Blackwood & Sons, Edinburgh.

Cast-Iron Head; do. electroplated with brass; do. bronzed.

Presented by Mr Jobson Smith, Sheffield.

Ornamental Table Top; an electro deposit in Copper as taken from the mould. By Messrs Elkington & Co., Birmingham.

Galvanic Battery and Trough for containing the solution of the metal used in electroplating.

*Compartment U.*

Collection of Indian specimens in Pewter, Brass, and Copper, including Bells, Bowls, Lamps, Plates, Vases, &c.

Presented by the Secretary of State for India, through Dr Forbes Watson.

*Compartment V.*

Collection of specimens of Enamelled Iron, including Pictures in Colours, Labels, Name-plates, Numbers, &c.

Presented by The Patent Enamel Co., Birmingham.

*Objects arranged over No. 2 Wall Case, East Side.*

Specimens of various kinds of Buttons, manufactured by Messrs Pigott & Co., Birmingham.

Specimens of Crown Taper Wood Screws in Iron and Brass, manufactured by Messrs Henn & Bradley, Birmingham.

Stages in the production of a Stamped Brass Ornament.

Presented by H.M. Commissioners of the Great Exhibition of 1851.

Specimens illustrating Brass Wire and Tube Drawing, and the stages in the production of a Stamped Brass Ornamental Weight. Brass Weight filled with cast-iron by a patent method, and broken specimen to show its section. Portion of a Brass Bedstead and of a Brass-mounted Iron Bedstead, showing mode of joining corners. Ornamental Brass Gas Brackets.

Presented by Messrs R. W. Winfield & Co., Cambridge Street Works, Birmingham.

Specimens of Carriage Door Handles, &c., in Brass and German Silver, by Mr James Holgate, London.



## No. 2 WALL CASE—EAST SIDE.

Specimens of Wrought Copper Nails, Rivets, and Spikes, by Messrs Bartrum & Pretyma, Upper Thames Street, London.

Presented by H.M. Commissioners of the Great Exhibition of 1851.

## FLAT TABLE CASES—EAST SIDE OF HALL.

*Flat Table Case A.*

Specimens illustrating the manufacture of Wire Cards, for the preparation of textile fabrics.

Presented by Mr John Milner, Dewsbury Road, Leeds.

Stages in a Roller-link for gasalier chains.

Specimens of Soft Metal Plates, used in "Nature Printing."

Presented by Mr R. W. Winfield & Co., Birmingham.

These are made by placing the real object—a fern, for example—on the plate and passing the two between metal rollers; the pressure produces an impression on the metal plate sufficient to print from.

Tray, Tea-caddy, Inkstand, and Portfolio of Papier Maché, inlaid with aluminium.

Presented by Messrs J. Bettridge & Co., Birmingham.

Japanned Tea-tray, showing the stages in the japanning.

Presented by Messrs Griffiths & Browett, Birmingham.

Processes in the manufacture of a Split or Key Ring.

Presented by Mr Josiah Mason, Birmingham.

Whale Knives from the Faroe Islands.

Ornamental Articles in damascened Steel, from Eskilstuna, Sweden.

Specimens showing stages in the manufacture of Screw Nails.

Presented by Messrs Nettlefold & Chamberlain, Birmingham.

*Desk Table Case B.*

Specimens illustrating the successive stages in the manufacture of a Pin, and examples of various kinds of Pins.

Presented by Messrs Edelsten & Williams, Newhall Works, Birmingham.

*Flat Table Case C.*

Specimens illustrating Die Cutting and Medal Stamping.

Presented Mr Joseph Moore, Birmingham.

Specimens of German Silver Spoon Blanks; Plain, Moulded, Twisted, and Pierced Wire; Cast Ornaments; and Polished Plate of German Silver.

Presented by Messrs Evans & Askin, Birmingham.

Stages in the manufacture of a German Silver Spoon and Fork.

Presented by Messrs Harrison Brothers & Howson, Sheffield.

Specimens showing the process of manufacturing a Silver-plated Waiter.

Presented by Messrs James Dixon & Sons, Sheffield.

Successive stages in the manufacture of a German Silver Thimble.

Presented by Mr Thomas Pratt, Birmingham.

## FLAT TABLE CASES—EAST SIDE OF HALL.

Illustrations of the manufacture of Gold Chains.

Presented by Mr B. W. Goode, Birmingham.

Specimens showing the successive stages in the beating out of Gold Leaf, with the materials and some of the tools used.

Presented by Messrs Joseph Lane & Son, Birmingham.

*Flat Table Case D.*

Specimens illustrating the manufacture of a Sportsman's Knife, Pocket Knife, and Razor.

Presented by Messrs Hunter & Son, Talbot Works, Sheffield.

Specimens of Cheap Razors.

Stages in the manufacture of a Table Knife and Fork.

Presented by Messrs Harrison Brothers & Howson, Sheffield.

Stages in the manufacture of a Lancet.

Presented by Messrs W. & H. Hutchinson, Sheffield.

Stages in the manufacture of a Pair of Scissors.

Presented by Messrs T. Turner & Co., Sheffield.

Specimens of Knives and Razors made by the Chinese and Japanese.

Specimens of Native African Knives.

Specimens of Knives made by North American Indians.

Specimens illustrating the manufacture of Chubb's Locks and Keys, with examples of Finished Locks made open to show their construction.

Presented by Messrs J. Chubb & Son, St Paul's Churchyard, London.

Egyptian Wooden Lock.

Presented by Mr John Chubb, London.

Wooden Lock from the Faroe Islands.

Swedish Padlocks.

Chinese Padlock.

Specimens of Ornamental Locks and parts of Locks in Iron and Brass; and specimens of Ornamental Wrought Iron Keys.

Presented by the Science and Art Department, London.

Stages in the manufacture of a Brass Watch-Key.

Presented by Messrs J. Parkes & Son, 5 St Mary's Row, Birmingham.

*Table H.*

Illustrations of the manufacture of Steel Pens.

Presented by Mr Joseph Gillott, Birmingham.

Specimens of Steel Pens.

Presented by Mr Josiah Mason, Birmingham.

Specimens of various kinds of Metal Buttons, manufactured by Messrs Allen & Moore, Birmingham.

Presented by H.M. Commissioners of the Great Exhibition of 1851.



**Bronze Powders.**

Manufactured and presented by Mr Louis Simon, Nottingham.

*Upright Table Case G.*

Specimens of Needles and Fish Hooks, and the processes of making them.

Presented by Messrs Bartleet & Sons, Redditch, Worcestershire. In the same case, Models of the Grinding Wheel, Stamping Press, and Eye-punching Machine are shown.

*Upright Table Case F, and Upright Case E.*

Series of specimens illustrating the preparation of Wire for Card-making, together with specimens of Cards for working Flax, Silk, Cotton, and Wool. Card-making Machine, actual size.

Presented by Messrs R. & C. Goldthorp, Cleckheaton.

**MANUFACTURE OF POTTERY.****NO. 3 WALL CASE—SOUTH SIDE.**

Large series of specimens illustrating the processes in the manufacture of Pottery.

Compartments A, B, C, D, E, F, G, and part of H, contain illustrations prepared by Mr Godfrey Wedgwood, of Messrs J. Wedgwood and Sons, Etruria, Staffordshire. In the first three compartments (A, B, C) the materials employed are shown in their raw and partly prepared state, and include the clays, Cornish stone (decomposing granite), flint, limestone, &c.; the slips prepared from these for the various kinds of bodies; the substances used for the glazes; the colouring materials, &c. In the Compartments D and E the different stages in throwing, pressing, moulding, and printing are exhibited by specimens chiefly in the "biscuit" state—that is, fired but not glazed. In the Compartments F, G, and the upper halves of H and I, are placed specimens which show the processes of gilding and enamelling, the mode of firing with seggars, examples of ware injured in various ways in the kilns, and some finished examples of different kinds of ware. A Parian figure of "The Nymph at the Well," together with the moulds used in producing it, are shown in the lower portion of Compartments E and G.

*Compartment H, Lower Portion.*

Specimens showing the materials used in the manufacture of Pottery, the stages in the throwing and printing of a Cream-pot, the stages in the throwing and glazing of a brown Tea-pot, and the mode of moulding a Jug. In this series the colours used in printing pottery are shown.

Presented by Mr C. T. Maling, Newcastle-upon-Tyne.

*Compartment I.*

Specimens showing stages in the throwing of a Stoneware Bottle and of a Moulded Tea-pot; also the materials used in the manufacture of Stoneware.

Presented by the Port-Dundas Pottery Company, Glasgow.

## No. 3 WALL CASE—SOUTH SIDE.

*Compartment J.*

The lower portion contains a series of specimens of Sussex Rustic Pottery.

Presented by Mr W. Mitchell & Son, Rye.

The remaining portion of this compartment, and also Compartment K, contains examples of Foreign Pottery, including Swedish, Russian, Moorish, Indian, African, and South American. Here there are two interesting specimens, in the shape of a Basin and Ewer, made by the Amazonian Indians from a mixture of clay and the bark of the Pottery-tree.

*Table Q.*

Model of a Potter's Wheel.

Model of a Jigger for making plates, cups, &c. On the end of this model there is a Squeezing-box, for pressing handles through a "dod."

Models of an Engine Lathe, and of a Common Lathe, with frame and wheel for both.

Painter's Wheel, used when lines of gold or colour are being put on pottery.

Tools for running Ornaments upon and piercing pottery.

Model of a Biscuit Oven or Kiln for firing pottery.

In this kiln the ware receives its first baking. The articles are piled up in cylindrical fire-clay vessels called seggars, which protects them from the direct action of the fires by which the kiln is heated. The outer cone, or "hovel," of the kiln is not shown.

Model of a Gloss Oven or Kiln, for producing the glaze on pottery.

The articles in the biscuit state are previously dipped in glazing material, which is fused into a gloss in this kiln. The mode of firing is similar to that employed in the biscuit oven, but the heat is not raised so high.

Model of an Enamel Kiln, used for firing enamelled pottery.

## MANUFACTURE OF GLASS.

## No. 4 WALL CASE, WEST SIDE.

*Compartments A, B, C, D, E.*

Series of specimens illustrating the manufacture of Window Glass, including the materials employed, and the successive stages in the blowing of Crown and Sheet Glass. In Compartments F and G there are examples of Glass Shades, Aquariums, Propagating Glasses, and Vessels for domestic purposes, and also of Patent Plate Glass. Compartment H contains specimens of coloured Pot Metal, Flashed and Stained Glass. Compartments I and J contain specimens of Enamelled Glass with stencilled ornament, Optical Glass, Railway and Ship Lenses, Deck Lights, Photographic Dishes, Rolled Plate Glass, Glass Roofing Tiles, &c. In the lower part of Compartment I there is a Roofing Tile made from the melted Basalt of Rowley Rag.

The whole of this series is presented by Messrs Chance Brothers, Birmingham.



## No. 4 WALL CASE—WEST SIDE.

*Compartments K and L.*

Series of specimens, on a small scale, illustrating the manufacture of Crown, Sheet, and Coloured Glass; also Patent Rough Plate Glass, in various patterns.

Presented by Messrs W. Hartley & Co., Sunderland.

Specimens illustrating the manufacture of Plate Glass.

Prepared at St Helen's Glass-Works, Birkenhead.

Specimens illustrating the manufacture of Flint Glass, including the raw materials, and the stages in the blowing of a Wine-glass, Bottle, Tumbler, &c.

Presented by Messrs J. Ford & Son, Holyrood Glass-Works, Edinburgh.

Model of Glassmaker's Chair and Marver, and examples of Tools used by Flint Glass-blowers.

*Compartment N.*

Specimens of Engraved Table Glass.

Manufactured by Messrs Pellatt & Co., London.

Specimens illustrating the manufacture of Flint Glass, plain and coloured.

Presented by Messrs Pellatt & Co., London.

Specimens of Artificial Gems, made from coloured glass.

Presented by Mr James Weston, Birmingham.

Necklaces, and other Ornaments of Glass Beads, in imitation of pearl, and coloured.

Presented by Mr E. C. Greiner, Berlin.

*Compartments O and P.*

Specimens of various kinds of Ornamental Bohemian Glass.

TABLE R, in front of No. 4 Wall Case, West Side.

Model of a Bottle-Glass Furnace, constructed of fire-brick.

Made by Messrs W. Harriman & Co., Blaydon-on-Tyne.

Specimens illustrating the manufacture of Common Glass Bottles.

Presented by Messrs Cookson, Cuthbert, & Co., South Shields.

## TABLE P.

Model Pot for Sheet and Crown Glass, made in Stourbridge Clay.

Models of Glassmaker's Marvers, Box, and Tools.

Models of Annealing Kiln for Crown Glass.

Model of Flatting and Annealing Kiln for Sheet Glass.

Flint Glass Pot, made of Stourbridge Clay by Messrs Harper & Moore, Stourbridge.

Model of a Flint Glass Pot.

## TABLE CASE S.

Specimens illustrating the proportion of Polishing Materials, including emery, ground glass, pumice, rotten-stone, &c.

Presented by Messrs John Oakley & Sons, 172 Blackfriars' Road, London.

Specimens of Hones.

## VARIETIES AND APPLICATIONS OF CARBON.

## No. 4 WALL CASE—WEST SIDE.

*Compartment Q.*

Ceylon and Travancore Plumbago, and Crucibles made from it.

Presented by the Patent Plumbago Crucible Company, London.

Illustrations of the preparation of Cumberland Lead for pencil-making, by Brockedon's patent process.

Presented by Messrs Brockedon & Co., London.

Illustrations of Black Lead Pencil-making.

Presented by Messrs G. Rowney & Co., London.

Varieties of Mexican Black Lead, for cleaning purposes.

Plumbago or Graphite, raw and purified, from Raabs, Lower Austria.

Presented by the Austrian Commission for the Great Exhibition of 1862.

*Compartment R.*

Specimens of Plumbago or Black Lead, suitable for pencil-making.

Presented by His Excellency George Peterson, St Petersburg.

Large samples of Plumbago or Black Lead, from a remarkable deposit about 3 feet thick on the right bank of the Lower Toongooska River, about 280 miles of Toorookhansk, Siberia.

Presented by the Russian Commission for the International Exhibition of 1862.

*Compartment S.*

Gas Coke or Graphite—the deposit formed in a gas retort.

Illustrations of the manufacture of Carbons, for electrical purposes.

Presented by Mr John Young, Gas-Works, Dalkeith.

Graphite formed on the side of an iron blast-furnace at Alfreton, Derbyshire.

Presented by Mr James Oakes, Alfreton Iron-Works.

Graphite from cast iron, Kinneil Iron-Works, Bo'ness.

Presented by Arch. Geikie, Esq., F.R.S., of the Geological Survey.

Granular Mineral Charcoal.

Presented by Professor Rowney, Queen's College, Galway.

Series of specimens of Anthracites and Bituminous Coals, from the Pennsylvanian Coal-field.

Presented by Professor H. D. Rogers, University, Glasgow.

## COAL, SHALES, PEAT, &amp;c.

*Compartment T.*

Albert Coal or Albertite, from New Brunswick. It yields 110 gallons of crude burning oil per ton.

Presented by the New Brunswick Commission for the Great Exhibition of 1862.

Kimmeridge Shale. This was the first shale used to distil burning oil from in Great Britain, but the disagreeable smell of the oil prevented its coming into general use.

Presented by Messrs E. Meldrum & Co., Bathgate.



## No. 4 WALL CASE—WEST SIDE.

Bituminous Shale, called Brazilian Coal, used to distil burning oil from.  
It yields about 100 gallons of crude oil per ton.

Presented by Dr Edwards, Royal Institution, Liverpool.

Bituminous Mineral, called "Albertite," found in fissures and cavities of the Old Red Sandstone rocks at Strathpeffer. It is rich as an oil-yielding substance. Specimens of the micaceous flagstone in which it occurs are also shown.

Presented by Her Grace the Duchess of Sutherland, through Mr J. Martin.

Specimens of Scotch Cannel or Parrot Coals, including the Boghead, yielding 120 gallons of crude burning oil, or 15,000 cubic feet of gas, per ton; the Brown Methel, yielding 10,000 cubic feet of gas, or 90 gallons of crude burning oil, per ton; the Black Methel, Capeldrae, Wellwood, Rochsoles, Overton, and Lesmahagow.

Presented by Messrs E. Meldrum & Co., Bathgate.

Small cubes of various Scotch Coals.

Presented by the late Mr William Murray of Monkland.

Specimens of "Cone-in-Cone" Coal.

Presented by Professor Archer and A. Bryson, F.R.S.E., Edinburgh.

Specimen of Button Spotted Coal, "Pot Bottom," from a pit at New Sauchie, Clackmannanshire.

Presented by Mr Robert Bald, mining engineer, Edinburgh.

*In Separate Case, opposite Compartment R of Wall Case.*

Entire section of Wemyss Parrot Coal Seam, from Wemyss Colliery, Fifeshire.

Specimen of a Table made of Wemyss Parrot Coal. (On end of this case.)

Presented by Mr Thomas Bywater, Wemyss Castle, Fife.

The cannel coal found at Wemyss, in Fife, is very suitable for cutting into various objects of an useful and ornamental character, as it is of a homogeneous texture and colour, and not liable to decompose when exposed to the air like many gas coals. Inkstands, picture frames, and the like, are made of it to a limited extent in the vicinity of the pit.—*See Bracelet, &c., cut from it in North Gallery, Table Case K.*

Entire section of the Working, from the Torbanehill Colliery, near Bathgate, containing the Torbanehill or Boghead Cannel Coal Seam and associated minerals.

Presented by Mr E. Meldrum, Bathgate.

Entire section of the Rough or Beefie Seam of Coal, from Dalkeith Colliery.

Presented by His Grace the Duke of Buccleuch.

## No. 4 WALL CASE—Compartment U.

Specimens of Coal, from near Tete, on the Zambesi, Southren Africa.

Presented by the Rev. Dr Livingstone.

Specimens illustrating the purification of Newcastle Coal by washing.

Presented by Mr James Morrison, Newcastle-upon-Tyne.

Hungarian Coal, Patent Fuel (compressed coal), and Lignite or Brown Coal.

Presented by Dr Joseph Szabo, Pesth.

Tertiary Coal (Lignite?) from Mackenzie River, near the mouth of the Bear Lake River, North America.

Presented by the Hudson Bay Company, through Mr Anderson.

Fine specimens of German Lignite or Brown Coal.

Presented by the Science and Art Department.

Specimens of German Lignite or Brown Coal, from various donors.

Specimens of Peat, from various donors.

*Compartment V.*

Specimens of the Tools used in Mining Coal.

Presented by His Grace the Duke of Buccleuch, through Mr E. Gibsone, Canonbie.

*In front of Wall Case, West Side.*

Ornamental Cast Iron Chimney-Piece, Grate, and Fender. A fine Berlin casting by Herr F. A. Egells of that city.

Presented by H.M. Commissioners of the Great Exhibition of 1851.

Ornamental-Iron Bedstead, with separate specimen showing the method of gilding and painting the corner pillars.

Presented by Messrs Taunton & Hatton, Birmingham.

**GREAT HALL—First Gallery.**

*At top of Stairs.*

Case containing a fine collection of Ornamental Feathers, some in their natural colours and some artificially dyed.

Lent by Messrs M. de Costa, Andrade, & Co., 61 Wood Street, London Wall, London.

**SOUTH GALLERY.**

*Under the Upper Stair Landing.*

Old Carved Oak Press.

Lent by Mr H. J. Rollo, W.S., Edinburgh.

**ANCIENT AND MODERN GLASS, POTTERY, & PORCELAIN.**

*Opposite Arched Opening between Great and Small Halls.*

Case containing specimens of Engraved Glass, exhibiting great merit in design and workmanship, as well as excellence of material.

Presented by Messrs Pellatt & Co., Falcon Glass-Works, Blackfriars, London.

**WALL CASE—FIRST BAY.**

*Compartments A, B, C, D.*

Cut Glass Candelabrum Pillars, and Ball and Stand.

Lent by Messrs F. & C. Osler, Birmingham.



## GLASS—MAJOLICA.

Specimens of Glass, engraved chiefly with fern patterns.

Presented by Messrs J. Powell & Sons, Whitefriars, London.

Specimens of Painted Glass, chiefly Vases, from Bohemia and Bavaria, including a Cup and Goblet, in imitation of the old German style; also a large silvered Glass Vase, decorated with enamelled ornament and imitation gems.

Plate and Tumblers of a curious iridescent Glass, from Hungary.

Specimens of Artificial Aventurine and Obsidian, and objects made of them, from Venice.

Aventurine is a natural mineral, namely, a quartz spangled with flakes of mica. Artificial aventurine is an imitation of this in glass, the gold-like spangles are supposed to be produced by suboxide of copper, but this is kept a secret, and it is only made in Venice. It is a costly material, and is highly prized for some kinds of ornamental work. Artificial obsidian is an imitation of natural obsidian or volcanic glass.

“Schmelze” Glass Vase, with silver mounting : modern : by Salviati, Venice.

Specimens of ancient Venetian Glass, including some of its most characteristic varieties, known as “latticino,” “vitro di trina” or lace-work glass, “millefiore” or flowered glass, “Schmelze,” and calcedony. Also a Tazza, with Portraits and Arms of the first four Doges of Venice, engraved with a diamond.

Venice obtained workmen from Constantinople early in the thirteenth century, who founded its famous glass-works. In the fourteenth century, after the glass-houses had all been transferred to the Island of Murano, the principal manufacture consisted of beads, imitations of gems, and the like. It gradually rose in importance, till, in the sixteenth and seventeenth centuries, Venice became the principal seat of the glass manufactures for all Europe. The most admired kinds were produced during this period. The outlines and ornamental patterns on this glass are produced solely by the dexterity and skill of the glass-blower without any aid from grinding or cutting. On the introduction of the cut glass of Bohemia in the beginning of the eighteenth century, the glass manufactures of Venice declined. The glass-blowers of Murano at the present day confine themselves chiefly to the manufacture of beads, just as their ancestors did in the fourteenth century.

Two ancient Cinery Urns and a Bottle of Glass, from the Necropolis of Tharros, island of Sardinia.

Old Dutch Glass Bottle, ornamented with a spiral line of white opaque glass.

Small Globular Vessel of ancient Roman Glass.

Specimens of ancient Egyptian Glass Beads and Bugles.

*Projecting Portion between First and Second Bays.**Compartments E, F.*

Collection of modern Majolica, consisting of Vases, Jugs, Jardinieres, Sconces, Trays, Tiles, &c.

Lent by Messrs Herbert, Minton & Co., Stoke-on-Trent.

## PORCELAIN.

SECOND BAY—*Compartments F, G, H, I.*

Collection of modern Worcester Porcelain, consisting of Vases, Statuettes, various Ornaments, and Table Ware, in painted, pierced, and jewelled Porcelain. Parian Statuettes, with a slight application of gold and colour.

Lent by the Worcester Royal Porcelain Company (Limited), Worcester.

*Projecting Portion between Second and Third Bays.**Compartments J, J.*

Collection of painted Porcelain, consisting of Vases, Candelabra, Jardinières, Seaux.

Patterns of Table Service, &c. Parian Statuettes.

Lent by Messrs Herbert, Minton & Co., Stoke-upon-Trent.

THIRD BAY—*Compartments K, L.*

Collection of Porcelain, consisting chiefly of Vases, painted with flowers and landscapes, Plates of Jewelled Porcelain, and Parian Statuettes.

Lent by Messrs Copeland & Sons, Bond Street, London.

*Compartments M, N.*

Specimens of modern Wedgwood Ware, consisting of Vases, with white cameo figures on a coloured ground, and three imitations of ancient Etruscan Vases.

Lent by Messrs Wedgwood & Sons, Etruria, Staffordshire.

*Projecting Portion between Third and Fourth Bays.**Compartments O, P.*

Specimens of old Dresden Porcelain, including two examples of the early Red ware made by Böttcher.

This was the first successful attempt to make porcelain in Europe. Böttcher was appointed director of the manufactory at Meissen, near Dresden, when it was first established in 1710.

Pair of Dresden Porcelain "Mayflower" Vases. (Shown in front of case.) Group of Game and Wild Drake: modern Dresden.

Specimens of Porcelain from some of the most noted of the German manufactories, begun after that of Meissen—viz., Vienna, established 1720; Berlin, established 1751; Höchst, established 1740; Fürstenberg, established 1750; and Frakenthal, established 1755.

Specimens of Porcelain from some of the manufactories of Italy, namely, that of Naples, established 1759; Capi de Monte, near Naples, established 1736; Venice and Lenove, of which the date of establishment is uncertain, but both of which ceased in 1812.

*Compartment P.*

Specimens of Sèvres Porcelain; white Gilded Tea-pot and Cup and Saucer, with green and white compartments of early date; Cup and Saucer, "Rose du Barry" ground; oblong Casket, painted with figures



## PORCELAIN—WEDGWOOD WARE.

in landscapes; two Cups with gilded green ground and medallions of flowers: modern.

The famous manufactory of Sèvres, near Paris, was the first to bring French porcelain to perfection, although it was previously made at St Cloud. Old Sèvres porcelain is considered to be the most beautiful porcelain ever produced. For the most part it was made only for royalty, comparatively few of its productions being allowed to be sold, and these at a high cost. It is still carried on by the French Government, and stands high among the manufactories of Europe.

Specimens of Belleville and Niderviller Porcelain; both established about 1790. Pair of Figures in Lustred Porcelain, and two Vases of Painted Porcelain—Modern French.

Coffee Service of Hungarian Porcelain.

*Compartment Q.*

Specimens of old English Porcelain, including that of Chelsea and Bow, which were the first English porcelain manufactories, and were established early in the eighteenth century; that of Derby, which was founded in 1751, and that of Worcester, also established in 1751, and still carried on by the Worcester Royal Porcelain Company.

Two Porcelain Jugs made at New Hailes, near Edinburgh, about a century ago.

Presented by Mr Archibald Hepburn, Tupsley, Hereford.

FOURTH BAY—*Compartments R and S.*

Collection of old and modern Wedgwood Ware, consisting chiefly of the famous jasper ware, decorated with classical subjects.

Josiah Wedgwood, the most celebrated of English potters, was born in 1730, and died in 1795. He made great improvements in the "paste" or body of pottery, and especially in its decoration. Flaxman, the sculptor, and other artists of merit, were employed in designing or in suggesting designs for his principal works. Among the specimens shown here there is one of the original fifty copies of the Barberini or Portland Vase which he made, and which are now very highly prized; a Portrait of himself in black jasper ware; and a Pyrometer, invented and made by himself for measuring the heat in pottery kilns.

*Compartments T and U.*

Collection of old English Pottery, including the embossed, the tortoise-shell, the cauliflower, and other characteristic old Staffordshire wares; also specimens of Leeds ware, Turner ware, and Liverpool ware.

*Compartment V.*

Specimens of Ancient Pottery, viz., Egyptian mummy or sepulchral figures, the manufacture of which was very extensive in ancient Egypt, they being universally used. These figures are supposed to have been employed as the substitute for human victims formerly offered at the grave in order to assist the deceased in his labours in a future state; sepulchral Clay Cone, with hieroglyphical inscription; and one of the Pots used to hold the embalmed and sacred Ibis. Also some small specimens of Greek, Etruscan, Roman, and ancient Indian pottery.

## MAJOLICA WARE.

*Compartment W.*

Imitation Majolica Ware, by Minton and Copeland.

*Compartments X and Y.*

Specimens of Italian Majolica ware of various periods, from A.D. 1500 to A.D. 1740.

The enamelled pottery of Italy, called Majolica, and sometimes Raffaele ware, from the fact that many of the paintings upon it were copied from Raffaele's designs, formed an important manufacture in that country during the fifteenth and sixteenth centuries. It attained its greatest development in the Duchy of Urbino, which included the four great manufactories of Pesaro, Gubbio, Urbino, and Castel Durante. Majolica is an earthenware often of a very coarse body, but covered with a smooth stanniferous glaze or enamel, and is characterised by the beauty and richness of its colours, by the brilliant iridescence of its lusted kinds, and by the bold and masterly execution of the painted landscapes and figure subjects on a large number of the specimens. Maestro Giorgio, Francesco Xanto, and Orazio Fontana are the best known of the Majolica painters. Of late years some choice specimens of this ware have realised prices which, considering the nature of the objects, appear almost incredible to any except connoisseurs.

## FIRST GALLERY—NORTH SIDE,

*Under the Upper Stair Landing.*

Case containing specimens of Ornamental Berlin Iron Castings.

The clean, sharp, minute work for which the Berlin founders are celebrated is well seen in many of the objects here displayed. Among the specimens in this case are two of the Liberation Crosses of 1813. These were worn by the Prussian ladies in lieu of gold ornaments, which they gave up to save the country from the grasp of Napoleon.

Octagonal Table of Derbyshire Black Marble, with ornament produced by removing the colour of the marble.

*Oblong Case A,*

Contains Art Objects in metal, and includes the following :—Egyptian Bronzes ; Indian Vase, with mythological figures ; Saracenic Vessel, with arabesque ornaments.

Ornamental Chest Handles, &c.

Presented by Mr W. Douglas, R.S.A.

Cinque Cento Bronze Statuette of a Negro riding on a Stag, and some small articles of ornamental metal work.

Presented by the Science and Art Department.

Bas-relief, "The Holy Dead," after Michael Angelo, an electro deposit. Natural Fruit and Leaves, coated with an electro deposit of copper, and electroplated.

Presented by Messrs Ratcliff & Co., Birmingham.

Walnut Wood Casket, with brass ornaments. Silver Filigree Flowers, electroplated with gold.

Candelabrum in ormolu and coloured Glass—Prussian.



Gilt Bronze Moorish Vase, Bronze Candelabra, and Basket with Game.

By A. Cain, Paris.

Statuette of a Roebuck, in Aluminium, by A. Christoffe, Paris.

#### OBLONG CASE B.

Bronzes by modern Sculptors and reproductions of Antique Bronzes.

Lent by Messrs Elkington & Co., Birmingham.

#### OBLONG CASE C.

Contains a very fine collection of Chinese Carvings in Jade, Sardonyx, Rock Crystal, and other minerals; also, Japanese specimens of Carved and Inlaid Ivory, Metal and Lac work, all of great artistic merit. Four Cups, each formed of a single carbuncle.

Lent by Colonel Seton Guthrie of Scotscauder.

Jade or nephrite is a hard translucent mineral, varying in composition, but its usual constituents are silica, magnesia, and lime, with occasionally a little alumina and oxide of iron. It is about as hard as rock crystal, which, together with its toughness, make it susceptible of fine workmanship and high polish. Its colours are milk-white, green, and various shades of gray. The pure white is most prized, and next to that the bright green. The Chinese have quite a mania for this mineral, and value first-rate pieces at more than their weight in gold. The specimens in this Case are very fine; and so likewise are some shown by Mr Dudgeon, of Cargen, in the North-East Room.—*See also the boulders of Siberian jade in Case C, ground floor of this Hall.*

#### WALL CASE E, END OF GALLERY.

Collection of Works of Art, consisting of Gilt Electro-deposits, Silver Repoussé work, and Coloured Enamels.

Lent by Messrs Elkington & Co.

Pair of Cast-iron Candelabra, bronzed by the Coalbrookdale Company.

These are fine examples of sharp and well relieved casting in heavy articles of a decorative character. One of them is placed in the North and the other in the South Gallery.

#### UPPER CORRIDOR, NORTH GALLERY.

##### *West End.*

Florentine Cassone or Linen Chest of Carved Chestnut Wood. A beautiful example of Italian Wood Carving of the sixteenth century. Wood Carving—Section of a Picture Frame. The design represents the Lily of Florence surrounded by the Rose, the Thistle, and the Shamrock.

Carved and Presented by Sig. Antonio L. Bulletti, Newcastle-on-Tyne.

Embossed Leather Panel, coloured and gilt, by Habenicht, of Vienna. A series of these panels is employed for the internal decoration of the Imperial Bank of Vienna.

Two Electro-copies of Suits of Armour in the Tower of London.

Lent by Messrs Elkington & Co.

## OBLONG CASE F.

Contains Wood Carvings, and includes an exquisitely beautiful Jewel Casket by Gueret Freres, Paris; some well executed Swiss carvings of Steinboks and Chamois; "The Dead Robin," and two Brackets by Kendall of Warwick; a few interesting Chinese Carvings in Bamboo and Cocoa Nut, from Dr Ivor Murray and others; African Carvings. There is also an example of inlaid Italian Woodwork made at Sorrento.

## TABLE CASE G.

Norwegian Wood Carvings, Spoons, Forks, and Paper Knives.

Presented by Mr Dudgeon of Cargen.

Pair of old Italian Bellows, of the Renaissance period, with a classical subject carved on the circular portion, and a figure of Pan on the nozzle.

Two Carvings in Walnut—Cherubs, and a Female Figure.

Stamped Austrian Leather Work; Trays and Stationery articles, painted and gilt. Card Trays made by the native Indians from the dyed quills of the North American porcupine, *Erethizon dorsatum*.

Boxes, Plate, and Album, made of oak inlaid with marble—Austrian work.

Box, Casket, and Portfolio of hazel wood, carved in imitation of leather—Austrian work.

Small Box and piece of Wood stained green by the fungus *Peziza aeruginosa*. This wood is much used in Tunbridge work.

Swedish Snuff-Boxes of carved birch bark.

Medallions of "Bois Durci."

This substance is made of the finely powdered sawdust of hard woods coloured black and mixed with blood. The mixture is pressed into moulds to form medallions and other ornaments.

Presented by the Inventors, M. Larty & Co., Paris.

Stages in the turning of an Ebony Seal Handle.

## TABLE CASE H.

Pair of French Head Wreaths, made of artificial leaves and the seeds of the Prayer Liquorice; and another pair made of the pappus of a plant.

Two Groups of Flowers, made of the cuticle of the *Yucca gloriosa*—Bermuda.

Piece of Lace Bark, the inner bark *Lagetta lintearia*.

Presented by Professor Douglas MacLagan, Edinburgh.

Child's Cap, made of Lace Bark from Jamaica.

Vegetable Ivory Nuts, Coquilla Nuts, and Areca or Betel Nuts, and articles made of them.

Presented by Messrs T. Padmore & Sons, Birmingham, and Mr Wardlaw Macfarlane, Edinburgh.

Native carved Coquilla Nuts.



The ivory nut (*Phytelephas macrocarpa*), and the coquilla nut (*Attalea-funifera*), are the fruits of South American palms; and the betel nut is the fruit of an East Indian palm (*Areca Catechu*). They are used to some extent in England for small objects of turnery.

India and Chinese Nuts elaborately carved for rosary beads.

Natural Seeds and Seed-vessels used for ornamental purposes, including the seeds of the Prayer Liquorice (*Abrus precatorius*), of the Coral Tree (*Erythrina Corallodendrum*), of *Ormosia dasycarpa*, of the Indian Shot Plant (*Canna indica*), of the Soapberry Tree (*Sapindus saponaria*), Job's Tears (*Coix lachryma*), Nicker Nuts (*Guilandina Bonduc*), Mimosa Seeds (*Leucena glauca*), the curious Seed-vessel of the Jack-Box tree (*Hura crepitans*), &c. The applications of some of these are shown.

## TABLE CASE I.

Old Battersea Enamels.

Illustrations of very skilful imitations of precious stones.

Pair of Circassian Holster Pistols with beautifully damascened barrels.

Presented by Mr A. Desfontaine, Clapham Park, London.

Russian Swords.

Hungarian Battle-axe.

## TABLE CASE J.

Large Silver-gilt Oval Dish, with Fruit and Flowers in coloured enamel and set with various precious stones—Augsburg work, 16th century. Large Cameo (Sardonyx?) carved with a figure of Zeus listening to the prayer of Thetis—Italian, 16th. century. Circular and Pendant Jewels in enamelled Gold, set with various gems, and containing representations of religious and mythological subjects—Italian and German work of the 16th century.

Lent by the Right Hon. W. E. Gladstone, M.P.

## TABLE CASE K.

Specimens of Head-dress Ornaments and articles of Jewellery, made in Brazil from beetles' wings. The insects themselves are also shown.

Their colours are brilliant and permanent, but they are rare and costly.

East Indian specimens of Bags and Baskets of the root of Cuscus Grass, ornamented with beetles' wings.

Specimens of Red Coral as it grows at the bottom of the sea. Carved Coral Bracelet, by Phillips of London.

Red coral is the hard axis or skeleton of a compound animal called *Corallium rubrum*, and is composed chiefly of carbonate of lime with a little animal matter. In life this axis is covered with a fleshy mass from which flower-like polyps, which constitute the essential structure of the animal, project. Delicate rose or pink coloured coral is more valuable than the deep red. Black coral, the production of another species, is the most valuable kind.

Siamese Bracelet of tiger's claws, set in gold.

Finely carved Ivory Brooch with mother-of-pearl back ground; subject, a Landscape with Deer—German.

Carved and tinted Ivory Brooches representing flowers—French.

Head Dress and other Ornaments made of Fish Scales, supposed to be those of a species of Mullet.

Chinese Head-dress formed of the wing feathers of a jay (*Cissa sinensis*).

Bracelet of Pique-work.

Chinese Tortoise shell Cup and Saucer.

Specimens of Ornamental work made from Human Hair, including some fine brooches, bracelets, and floral devices.

Presented by Mr Charles Packer, 136 Regent Street, London.

Specimens showing the ornamental applications of Whitby Jet, including a fine large mass partially polished and engraved.

Presented by Messrs Turnbull Brothers, Whitby, and Mr Packer, London.

Jet is a mineral which has long been prized for its lightness, deep black colour when polished, and facility of being turned and carved. It is found in England at Whitby, among the lias shales, in lumps and nodules. It is a kind of coal, but resembles amber in composition and lustre. Large pieces free of flaws are rarely found.

Brooch and Bracelet of Wemyss Cannel Coal.

Set of Onyx Jewellery and Necklace; in imitation of pink coral.

Presented by Mr Charles Packer, Regent Street, London.

Articles made of a Patent Composition of Shell Lac.

Presented by Mr Manton, Regent Works, Birmingham.

Brooch carved in opaque Amber—German. This pale yellow kind of amber is highly valued.

Cameos formed by a deposit of carbonate of lime and oxide of iron from the mineral waters of Karlsbad, called "Sprudel Stein." See large

Vase of same material in Entrance Corridor.

Italian Marble Mosaic Brooch, representing flowers and fruit.

Italian Glass Mosaic Brooches.

#### TABLE CASE L.

##### Containing economic application of Shells.

Shell of the *Pinna apiculosa*. Silky fibre forming the Byssus of same, with Mits and Net made from it.

Internal Shell of the Cuttle Fish used as tooth powder.

Cowrie Shells (*Cypræa moneta*), used as money in some parts of Africa.

Shells of *Cypræa tigris*, used for ornamental purposes.

Shells of *Venus mercenaria*. The sea-worn fragments are used to make coins by the North American Indians.

Shells of a species of *Fusus*, used in India for devotional purposes.

Shells of *Comus litera*, from the Philippines, used for ornaments by the natives of Southern Africa.

Cameo Shells, *Cassia rufa* and *Cassia tuberosa*, with cameos cut upon them.

The Window Shell, *Placuna sella*, used by the Chinese as a substitute for glass.

Shells used for inlaying, including the Top Shell, *Turbo marmoratus*; Ear Shell, Ormer Shell, and other species of *Haliotis*; Mother-of-Pearl Shell, *Mateagrina margaritifera*; Shell of *Pinna nigra*, &c.

Illustrations of the mode of preparing Shells for inlaying and other purposes.



Carved Shells, Brooches, Bracelets, Necklace, Flowers, and other ornamental applications of shells. A basket of Shell Flowers from the Bahama Islands is shown on a table near this case.

Italian Shell Cameos.

Shell of the Chinese River Mussel, *Unio Hyria*, with small figures of joss-men coated with a pearly secretion.

Shells of the Freshwater Pearl-Mussel containing pearls; also specimens of fine, inferior, and faulty Pearls from Scottish rivers.

Mother-of-Pearl Shell containing a large pearl.

Pearls are calcareous secretions produced by the fish of molluscous animals. Their formation is due to the accidental presence of some foreign matter on the shell or in the body of the animal. This forms a central nucleus, which the creature coats with nacre to allay irritation. Pearls are found in pearl-oysters, fresh-water mussels, and some other shell-fish. The finest kinds are obtained from the great pearl-fisheries of Ceylon and the Persian Gulf, but some valuable ones are also occasionally found in the Scottish and Welsh rivers.

Chinese Artificial Pearls.

*In Openings of Wall opposite Table Case L.*

Papier Maché Cabinet inlaid with coloured shellwork and gilt.

Chinese Table of inlaid and carved woodwork, from Ningpo.

*In Windows of Upper Corridor.*

Painted Glass Window, with picture of Elijah fed by the ravens; two Stained Glass Windows, as specimens of quarry glazing; Window in imitation of early geometrical work, printed pattern; and Coloured Window of "jewel" glass.

Presented by Messrs J. Powell and Sons, London.

Small Circular Stained Glass Window.

Presented by Messrs Chance Brothers, Birmingham.

Specimen of Dutch Painting on Glass.

Presented by Messrs Gebr. Smits, Rotterdam.

*In Side Openings of End Archway.*

Pair of Candelabra in white Ironstone Porcelain.

**NORTH-EAST ROOM—North End of Natural History Hall.**

**WALL CASE, SOUTH-WEST CORNER.**

*Compartments A, B, C.*

Collection of Japanese objects, including specimens of Embroidered and Figured Silks, Coloured Crape and Velvets; two State Robes of Embroidered Silk; Pictures on Crape and Paper; Oiled Paper Overcoat; various Hats; Six-leaved Cane-work Screen; Basket-work; Model of a House; Despatch Boxes, lacquered, gilt, and inlaid; Shola Pith Boxes; Porcelain; Swords; Spears, &c. The greater part of these Japanese specimens are

Presented by Her Majesty the Queen, through the Science and Art Department.

The objects in this case show the neatness and skill of the Japanese in several branches of the Industrial Arts. As specimens of woven fabrics, the figured silks, crapes, and velvets deserve attention, especially the two Damios dresses, which are fine examples of silk weaving, printing, and embroidery. The basket-work is very beautiful and suggestive, and so is the model of a Japanese house in open cane-work. Another neat application of this cane-work is shown in the outer casing of the egg-shell porcelain cups. The Japanese porcelain, of which several pieces are shown, is inferior to the Chinese. Good examples of the well-known lacquer ware, or "Japan ware," are shown chiefly in the form of despatch boxes, sometimes called glove boxes. The best kinds of lacquer ware are usually inlaid with gold. The artistic skill and comic humour of the Japanese is well seen in the buttons or buckles used for fastening the dress, some of which are shown in the *window desk-case K* and in Colonel Guthrie's collection, *case C, North Gallery*. In this large case there is one of the curious oiled paper waterproof coats; but the various uses of paper by the Japanese are noticed in that part of the catalogue referring to the paper series.—See "Educational Room."

*At Sides of Opening into Corridor.*

Burmese Figures of Guadama with attendants.

Lent by Dr John Balfour.

WALL CASE, NORTH END.

*Compartments D, D, D.*

Chinese Printed Coverlets, made of a peculiar kind of Wool.

Presented by Mr Patrick Dudgeon of Cargen.

Chinese Theatrical Dress, embroidered with gold; Mandarin's Dress, complete; Figure of a Chinaman sitting in a furnished apartment; Lady's Shoes; Idols and other Figures; Embroidered Fans, &c.

Presented by Dr J. Ivor Murray.

Models of a Chinese Lady's Feet with Shoes.

Presented by Dr S. Coull Mackenzie, Edinburgh.

DESK CASE IN WINDOW—*Compartment E.*

Antique Chinese Enamels and Bronzes; Chinese Metal Mirror.

Presented by Dr J. Ivor Murray.

*Compartments F, G.*

Chinese Stamps cut in Soapstone; piece of the Porcelain Tower at Nankin; various specimens of Chinese Porcelain, including examples of the Egg-Shell kind.

NORTH-WEST CORNER WALL CASE H, H.

Chinese specimens, including Pictures for Wall Decoration; Plaited Paper Pictures for Window Blinds; Model of a Chinese Junk; Crackle-ware Vases and other Porcelain; Basket-work; Inlaid Lacquer Work, &c. The specimens in this case are chiefly

Presented by Dr Ivor Murray.



## DESK CASE IN WINDOW, NORTH SIDE.

*Compartments I, J.*

Chinese specimens, including Lacquer and Lac Work, Porcelain and Clay Figures, Chop Sticks, &c.

Presented by Dr J. Ivor Murray.

Two Tinted Ivory Carvings from a screen in the Summer Palace.

Presented by Dr Charles Wilson, Edinburgh.

Two Presentation Sets of Chinese Ink.

Lent by Colonel Seton Guthrie and Mr Dudgeon.

The Chinese collection, which is displayed in several separate cases, includes illustrations of those wares for which China is, or has been, specially noted, such as porcelain, enamels, bronzes, stone carvings, and lacquer work. Some of the finest specimens shown are lent by Mr Dudgeon of Cargen, *oblong case J*, and Colonel Seton Guthrie, *case C, North Gallery*. Porcelain has been made in China for more than 2000 years. It was introduced into Europe at the beginning of the sixteenth century; but the finest kinds were made in China some centuries before that time. Of this old porcelain there are a few specimens shown, viz., a vase, with a fine iridescent ruby glaze, one or two old "crackle ware" vases of small size, and some examples of the pure white variety. The specimens of enamels, though small, are interesting, both on account of their beauty, and as illustrations of an art which is said to be now lost in China. Several kinds of lacquer ware are shown, the oldest and finest of which is the *red*, with figures and ornament in relief. Many of the bronzes and carvings in wood and stone show the power of the Chinese in designing fantastic figures, and their great accuracy in representing flowers and fruit.

*Compartment K.*

Japanese Buttons or Buckles of various curious designs, used for fastening the dress; inlaid lacquer work Cups and Saucers; Stone Ink Slabs with natural fossils, &c.

## UPRIGHT CASE, NORTH SIDE.

*Compartments L, L, L.*

Specimens from India and the Indian Archipelago as follows:—

Green Cashmere Coverlet, embroidered with gilt silver, formerly in the possession of the King of Oude.

Presented by Dr Fayrer, formerly resident surgeon at Lucknow.

Embroidered Silk Shawl, from Delhi; Dacca Muslin Scarf, embroidered with silver; black Net Scarf, embroidered with silver; Silk Scarfs; Silk Cap worn by Mapilas of rank, from Dr Cleghorn; Embroidered Sandals; Pulicat Maps; Basket Work; Javanese Hats.

Sacred Brass "Peacock" Lamp. Two Ornamental Spears with lacquered hands, from Malabar; fine Spear, with chased ornament and gilt silver mounts, from Cutch.

## DESK CASE IN WINDOW, NORTH SIDE.

*Compartment M.*

All the compartments of this the centre case, are filled with East Indian specimens.

Hookah Bowls or Vases of Bidri Ware and Hookah Snakes; Enamelled Sprinkler from Hyderabad.

*Compartment N.*

Engraved and embossed Brass Vessels from Gowhatty and Assam.  
Ornamental Brass Spoons.

Two Knives and Style, with gold and silver mounts, for writing on palm leaves.

Presented by Mr Andrew Walker, late of Ceylon Civil Service.

Other specimens of Knives and Styles for writing on palm leaves.

Knife and Sheath, with silver ornament and chain.

*Compartments O and P.*

Specimens of Lacquered Wood-work from Scinde.

*Compartment Q.*

Lacquered and Gilt Bed-posts, from Hyderabad. Papier Maché Pen Cases, from Cashmere.

*Compartment R.*

Carved Sandal-wood Box. Porcupine Quill Inkstand. Inlaid Ivory Work from Bombay.

*Compartment S.*

Ivory Carvings of Indian Mythological Figures. Various objects in Ivory, with carved and incised ornaments.

*Compartment T.*

Delicately carved Soapstone Trays from Agra.

The Indian collection, although embracing only a few costly specimens, is perhaps the one which deserves most attention from those whose tastes or occupation have any bearing upon ornamental art. Save in the representation of the human figure, the art workmanship of India, as applied to their various manufactures, is quite unrivalled. Elegance of design, harmony of colour, and judicious application of ornament, is uniformly seen in the productions of this country. Of the specimens shown, the arms and metal work, diffused through several cases, show this tasteful handiwork in the most elaborate manner; but the textile fabrics, the lacquer work, the stone, wood, and ivory carvings, show equally well the great skill of the natives in embellishing even the most trivial objects.

## UPRIGHT CASE, NORTH SIDE.

*Compartments U, U, U.*

Burmese specimens as follows:—

Native Pictures. Subjects—Princess ordering the Huntsman to cut off the tusk of the White Elephant (on top of case); and scene of the Brother of the Burmese god Guadama being made a Priest. Carved and painted figures of a Giant, Alchemist, and Doctor. Carved Mythological Figures. Specimens of Lacquer Ware, Sandals, Metal Gongs, Elephant's Tusks, &c.

Presented by Mr William S. Steel, Rangoon, Burmah.

Lacquered Bamboo Box.

Presented by the Secretary of State for India.



Burmese Dresses and lacquered Vessels.

Lent by Dr John Balfour.

Tavoy Woman's Dress, ornamented with seeds of a species of grass  
(*Coix* sp.?)

Presented by Professor Macdonald, St Andrews.

DESK CASE IN WINDOW.

*Compartment V.*

Burmese Manuscripts, with the characters inscribed with a steel point on palm leaves. Burmese Manuscripts, with the characters painted and gilt on palm leaves.

Three lacquered Burmese Cups—one presented by Miss Robertson, 2 Malta Green Place, Edinburgh.

*Compartment W.*

Models of Burmese Musical Instruments.

Presented by Mr T. B. Tytler.

*Compartment X.*

Specimens of Ornamental Porcupine Quill Work, with specimens of the quills, hair, sinews, and other materials used. Made by different tribes of North American Indians.

Presented by Miss Christina Ross and Mr Bernard R. Ross, Hudson's Bay Company.

NORTH-EAST CORNER WALL CASE, EAST END.

*Compartments A, A.*

Deer Skin Dresses worn by Chiefs of different North American Indian tribes.

Presented by Mr Thomas Constable, Edinburgh, Mr B. R. Ross, and the Rev. W. W. Kirkby, of the Hudson's Bay Company.

Pair of large Snow Shoes.

Presented by Mr James Hargrave, Hudson's Bay Company.

Models of two Dog Sledges, Carved Ornaments, &c., from the Indians of the Rocky Mountains.

Presented by Dr Hector.

Snow Shoes, small size and in model, and Snow Walking Stick; Babiche Hunting Bags, Caps, Hoods, &c. From various North American Indians.

Presented by Mr Bernard R. Ross and others.

DESK CASE IN WINDOW, EAST SIDE.

*Compartment B.*

North American Indian Mocassins (native shoes); Sleigh Gloves, Mittens, Smoking Bag, and other objects, richly embroidered with silk and beads.

Presented by Mr B. R. Ross and Miss Christina Ross, Hudson's Bay Company, and Mrs Millar, Edinburgh.

The North American Indian specimens are chiefly from the tribes inhabiting the Hudson's Bay territories. The dresses are made for the most part of

the skins of the moose-deer and rein-deer, both of which are of inestimable value to the natives of these regions. Besides yielding food, and leather and fur for clothing, the hides furnish lines, and "babiche" or twine for various purposes; their sinews yield thread, and their bones and horns are made into spoons, knife handles, tools, and other articles. One of the chief's dresses shown has leggings fringed with scalp locks—that is, locks of hair taken from the heads of victims slain in battle. Robes so garnished are highly prized by their wearers, and are difficult to obtain. Most of the dresses shown are beautifully ornamented with a kind of embroidery of porcupine and goose quills. Some interesting examples of porcupine quill-work are also shown in the adjoining window case, Compartment X.

*Compartment C and D.*

Esquimaux specimens from the Mackenzie River district, including Models of Boat and Canoe, Wooden Boxes, Knives, Fishing Hooks and Lines, Bows and Arrows, Spears, domestic articles of Bone and Ivory, and personal Ornaments.

Presented by Mr R. Macfarlane, Hudson's Bay Co.

Esquimaux Trousers of Seal Skin, Boots, Tobacco Pouch, and Dog Harness, from the east coast of Greenland.

Presented by T. Graham Kerr, Edinburgh.

UPRIGHT WALL CASE, EAST END.

*Compartment E.*

Russian Specimens as follows:—

Samoyede Dresses of Reindeer Skin.

Presented by the Russian Commission for the International Exhibition of 1862.

Russian Sewed Work Table Cover. Lacquered Bowls. Basket-work.

Silk and Gold Sashes worn by Russian peasant Brides. Made in Torshok, Government of Iver.

Presented by his Excellency George Peterson, St Petersburg.

DESK CASE IN WINDOW, EAST SIDE.

*Compartment F.*

Specimens from the Bassuto Africans, including a small figure of a Native Woman in full costume, together with the personal Ornaments of the actual size worn; Basket; Testament printed in the native language, &c.

*Compartment G.*

Kaffir Chief's Shield, Spear Head, &c.

Presented by Mr A. H. Turnbull, 3 George Street, Edinburgh.

Chief's Head Dress, and personal Ornaments worn by Kaffirs.

Presented by the late Rev. Henry Calderwood, Cape Colony.

Sword with Carved Sheath, and Carved Wooden Shield, from the Cape of Good Hope.

Presented by Mr J. F. Zeirvogel.



*Compartment H.*

Carved Fan, with graphic Symbols; Carved Gourds, Calabash, and other objects, from Old Calabar.

Presented by Dr A. Hewan.

Palm Fibre Dresses and other articles, from Old Calabar.

Presented by the late Rev. Zerub Baillie.

Native Pillow, Baskets, &c., from the Zambesi District.

Presented by Dr J. Kirk.

Iron Bracelet from Manganga Country.

Presented by Dr Livingstone.

Wooden Pillow used by the Mandingo Africans, and other native African articles.

Presented by Mrs Millar, Anne Street, Edinburgh.

## UPRIGHT WALL CASE, EAST END.

*Compartment I.*

Specimens from Iceland as follows :—

Old Tapestry which was hung up in the tent at Thingvalla, where the Athing, or Icelandic Parliament, was held until 1800. The oldest portion was embroidered by the nuns during the Catholic times of the country. The more recent portion was done shortly after the Reformation.

Icelandic Lady's Dress, with silver Ornaments.

This kind of dress appears to have been worn by the Icelanders with but little alteration from a very early period. The silver ornaments are very beautiful, and somewhat resemble Indian and Maltese filigree work in the same material. The dress of the poorer classes have these ornaments of brass. Upon the small plates attached to the sleeve button, the names of husband and wife are usually engraved at their marriage.

Carved Porridge Bicker.

Presented by Dr W. Lauder Lindsay, Perth.

Saddle Cloth, Bridle Bit, and Whip; Embroidered Gloves, Brass Lamp, &c.

## DESK CASE IN WINDOW, EAST END.

*Compartments J, K, K.*

Specimens from the Fiji Islands, including Palm Fibre Matting, Fans, Baskets, "Likus" or Women's Dresses; Head-Dresses, Cocoa-nut Fibre Cord, Machine for Printing Bark Cloth, Pillows, Musical Instruments, Coral Graters, Fish Hook, Tatooing Instrument, Gourds, Idols, &c.

## SOUTH-EAST CORNER WALL CASE, EAST END.

*Compartments M, M,*

Also contains Fijian specimens, and includes a Model of a Temple, two Models of Double Canoes; Carved Food Tray; Pottery Cooking Vessel; War Clubs; Mosquito Curtains and Dresses made of the bark of the paper mulberry.

The native cloth worn by the Fijians is made from the cloth of the Malo or Paper Mulberry (*Broussonetia papyrifera*). It is called "Tapa" or "Kapa," and is the chief material employed by these islanders for clothing. The cloth is prepared from the bark of the young tree when about 12 feet high, and one inch in diameter, by first steeping and macerating and then beating it out with a mallet. The pieces are easily joined together by the natural sap, which is glutinous, but some paste or glue is used as well. The large mosquito curtains (sometimes 100 feet long) are made of the same material. The scanty dresses are usually worn pure white, but some of them are printed with tasteful patterns. One of their primitive printing machines or blocks is shown. From this same tree, which yields the Polynesians cloth, the Chinese and Japanese make paper—one use of which, at least in Japan, is to make dresses.

#### CASES, &C., IN CENTRAL PORTION OF FLOOR.

##### *Arranged on Screens.*

Series of Photographs of the People of India, Burmah and Malayan Peninsula, including the Native Princes.

Presented by the Secretary of State for India, through Dr Forbes Watson.

#### DESK CASE A, B,

##### *Compartment A.*

Chinese Silver Jug and Vase, and Jewish Silver Amulet. Ancient Egyptian Gold Ring.

Presented by Dr J. Ivor Murray.

Egyptian Coffee-Stand, Perfume Holder, Antimony Flask and Writing Case of Parcel gilt silver.

Presented by the Science and Art Department.

Gold Cup, with signs of the Zodiac, from Ava.

Lent by Colonel Yule.

Silver Angdan or Fire-holder, from Delhi; and Burmese Silver Cup, with signs of the Zodiac.

Lent by Dr John Balfour, Leven.

Silver Casket of 16th century, Flemish work; and two Gold Rings of 16th century work.

Lent by Mr W. R. Binns, Worcester.

Champagne Glass, and Bon-bon Boxes of Glass, ornamented with interleaved silver—French. Ancient Silver Bicker or Drinking Cup; Breastplates or Brooches, and Ornamented Pins—Icelandic. Small specimens of Swedish Silver-work.

Silver Brooch with Painting of a Temple—Delhi work.

Presented by Mrs Archer, 9 Argyle Square.

##### *Compartment B.*

Specimens of Indian Jewellery, including gold and silver Filigree work; Enamels; Rings and Brooches set with gems; Maltese Coral and Lava work in gold settings, &c.

Lent by Dr John Balfour, Leven, Fifeshire.



## DESK CASE C, D.

Figured Fabrics of Silk, Gold, and Silver, made at Moscow, and used for vestments of the Priests of the Greek Church.

## DESK CASE E, F.

*Compartment E.*

Specimens of Old Venetian Lace, including the kinds called "Point de Venise" and "Guipure;" Old Valenciennes Lace; Venetian Silk Sleeves of Embroidered Net-Work—17th century work.

*Compartment F.*

Specimens of Maltese and Grecian Lace; Grecian Sewed and Embroidered Work.

Lent by Mrs Munro, 16 Scotland Street.

## OBLONG CASE G.

Specimens of Chinese, Capo di Monti, Sèvres, and other Porcelains; Gres de Flandres Pottery; Venetian and German Glass; Dresden Enamels and Limoges Enamels; old Silver Work; old Jewellery; Pique Work; Ivory Carvings; Mosaic Work, &c.

Lent by Mr Horatio Maculloch, R.S.A.

## OBLONG CASE H.

Specimens of Artificial Flowers and Plants.

From the Paris Exhibition of 1867.

## OBLONG CASE I.

Chinese specimens, including Carved Figure, Joss House Bronze Candlesticks, Carved Red Lacquer Ware, old Crackle Ware, white and other Porcelain, Lacquered Book-case, Ivory Carvings, Arms, &c.

Presented by Dr Ivor Murray.

Chinese Paintings on the Leaves of the Peepul Tree (*Ficus religiosa*).

Presented by Mr James Jeffrey, Hong Kong.

## OBLONG CASE J.

Chinese specimens, including a large Enamelled Vase: Carved Rhinoceros Horn; finely Carved Jade Vases and Cups; Carved Ornaments in Amethyst, Calcedony, and other ornamental Stones; Screen with Chrysanthemum carved in Slate Stone in two different coloured layers; fine specimen of Carved Lapis Lazuli, and two inscribed Tablets of same; Carved Chou-Chou Stands; Carvings in Horn and Bamboo; Bronzes; Porcelain, &c.

Lent by Patrick Dudgeon, Esq. of Cargen.

## OBLONG CASE K.

Specimens, chiefly Indian, including a Carved Ebony Casket, with medallions of Delhi paintings on ivory; Carved Sandal-wood Envelope Case; Carved Ivory Paper-knives; Carvings in Soapstone; Casket, and some smaller articles in "Koftgari" work (steel inlaid with gold); Japanese Inlaid Cabinet; Carved Chinese Tortoise-shell Box, &c.

Lent by Dr John Balfour, Leven, Fife.

## OBLONG CASE L, L'.

*Compartment L.*

Two Florentine Ebony Cabinets, the one with hunting scenes and figures incised on plates of inlaid ivory, the other with inlaid ornaments of ebony and ivory; Portmanteau of Stamped Leather, "Cuir Bouilli" work; Box of "Jessi" work; Italian Mendicant Figures in Coloured Clay; Border for Altar Covering, embroidered with gold and silver and gems—Venetian, 16th century; old Venetian Silk Embroidery; and a specimen of old Venetian Silk Damask, given by Mr W. Douglas, R.S.A.

*Compartment L'.*

Steel Casket with Engraved Figures, 16th century work; Apostles' Jug, Franconian ware; old Glass Bottle; Napkin of the last Earl of Winton, with full Seton Arms, date 1712.

Lent by George Seton, Esq., St Bennets, Greenhill.

## OBLONG CASE M, M'.

*Compartment M.*

Specimens of old Roman, Venetian, and French Bronzes; Embossed Brass Dish—Persian; Embossed and Enamelled Brass Dish—Venetian; Japanese Porcelain Plate; Persian Earthenware Jar; Venetian Porcelain Bottle; Ancient Roman Marble Head of a Girl; old Venetian Lantern, with plate of horn, &c.; specimens of early Bookbinding, chiefly Venetian.

Lent by Mr W. Douglas, R.S.A.

*Compartment M'.*

Old Worcester Porcelain, from the collection of Mr R. W. Binns, of the Royal Porcelain Works, Worcester.

Two Majolica Plates, with painted Roman battle-pieces, and one with painted masks and medallion portraits.

Lent by Mrs Munro, 16 Scotland Street, Edinburgh.

## DESK CASE N, N.

Collection of Plaques and Medals, chiefly in Bronze, of various countries and dates. Italian, Spanish, and other Ivory Carvings; Daggers and Butcher's Steel of the 16th and 17th centuries.

Old Venetian Enamelled Box, Senator's Buttons, and Ornamental Keys; Etui Cases; Steel Handle, with inlaid Silver Work; Cinque



Cento and Mediæval Ornamental work in Bronze and other Metals; Early Greek, Etruscan, Roman, Italian, German, and Scandinavian Rings, in Gold, Silver, and Bronze.

Lent by Mr W. Douglas, R.S.A.

#### OBLONG CASE P.

Specimens of Modern Silverplate, designed and manufactured by Messrs Mackay and Co., Edinburgh; Old Ivory Carvings; Cinque Cento Metal-work; fine specimens of Limoges Enamels, &c.

Lent by Messrs Mackay, Cunningham, and Co., Princes Street, Edinburgh.

#### OBLONG CASE Q.

Indian specimens, including two fine old Bronze Castings of a Lamp and Frame, upon which mythological subjects are represented; Bronze Model of a Temple; Brass Salagrama Stand and two Lamps; large Flower Stand carved in Blackwood; Matchlocks, with Damascened Barrels and gold inlaid and lacquered stocks; two Bows and Quiver of Arrows, with lacquered ornament; Shield from Cutch, with gilt bosses and lacquered ornament, a beautiful specimen; other Shields; Sabre with Damascus Blade, the sheath of red velvet, with gilt metal mounts; various Swords and other Arms.

Warrior's Belt, with powder-flask, match-box, bullet-pouch, steel, &c., from the hill tribes, Upper India.

Presented by Mr I. Anderson-Henry, Hay Lodge, Trinity.

#### PIER CASE R.

Figure of Buddha in Alabaster; Figure of Vishnu in Marble; small Mythological figure in Marble.

#### PIER CASE S.

Buddha and other Mythological Figures in Alabaster, Stone, Bronze, Silver, and other Metals.

#### OBLONG CASE, WITH SLOPING SIDES, T.

Human Mummy, from Thebes, in Upper Egypt, supposed to be about 3000 years old. The coffin is covered with painted figures and hieroglyphics.

Presented by Sir Joseph Straton.

Cover of Mummy Coffin, with nine columns of hieroglyphics. A very early specimen.

Ancient Egyptian Sepulchral objects, including an inscribed Clay Cone, an inscribed Brick Mummy Figure, Scarabæi, Wooden Pillow, Sandal, &c.

Egyptian Mummy Crocodile.

Inca Mummy Child, with Pottery and Spear, from Peru.

**SMALL HALL—First Gallery.**

## WALL CASE, NORTH SIDE.

*Compartment A.*

Specimens of Fibre prepared from the husk of the Cocoa-nut, *Cocos nucifera*, and Matting, Brushes, Cordage, &c., manufactured from it.  
Presented by Mr Thomas Treloar, 42 Ludgate Hill, London.

*Compartments B and C.*

Series of specimens illustrating the Manufacture of Bonnets, Hats, and other articles from English Wheat Straw, including stages in the cleaning, dyeing, splitting, and plaiting of the Straw; also Specimens of fine Italian Wheat Straw for Tuscan Plait.

Presented by various Luton and Dunstable Manufacturers, through Mr A. J. Tansley, Luton.

Fine Wheat Straw for the Plait of Leghorn Bonnets.

Presented by the Italian Commission for the Great Exhibition of 1862.

Straw grown in Orkney, prepared for Bonnet-making.

Presented by Mr John Rendall, Stromness.

Palmetto (Palm Leaf) Plaits—Bermuda.

Specimens of Swiss Braid and Embroidered Crinoline (Horse Hair) for Bonnets.

Presented by Mr A. J. Vieweg, Luton.

Models and Full-sized Specimens of Plain and Ornamented Crinoline Bonnets.

Presented by Mr A. J. Tansley, Luton.

Cotton Braids for Ladies' Bonnets.

Presented by Messrs Standring and Brother, Manchester.

White Chip Cotton Braid Bonnet.

Presented by Mr A. J. Tansley, Luton.

*Compartments D and E.*

Illustrations of the manufacture of Felt Hats, with the various kinds of Furs and Wools used.

Presented by Messrs W. Wilson & Co., Newcastle-on-Tyne.

Wool and fur *felts* or mats into a more or less firm fabric by means of the small projections or serrations on the fibres which lock into each other when rubbed or squeezed.

Series of Specimens, Blocks, and Tools illustrating the manufacture of Silk Hats.

Prepared by Mr Mein, Edinburgh.

*Compartments F, G, H, I, J, K.*

Specimens of prepared Russian Reindeer, Sheep, Lamb, Angora Goat, Fox, Squirrel, and Ermine Skins.

Presented by the Russian Commission for the International Exhibition of 1862.



MANUFACTURES FROM HORN, BRISTLES, &c.

WALL CASE.

Collection of prepared Fur Skins.

Presented by Mr E. B. Roberts, Regent Street, London.

Rug formed of the Skin of the Chamois.

Upon the Wall above the Wall Case, specimens of Tiger, Leopard, and other Skins, used for various purposes are shown.

DESK CASE, NORTH END OF FIRST GALLERY.

*Compartments A, B, C, D, E.*

Series of Specimens and Tools illustrating the manufacture of Combs and other articles from Horns and Hooves.

Prepared by Messrs Blackhall and Scott, Edinburgh.

*Compartments F and G.*

India-rubber Combs. Boxwood Combs. African and Fiji Island Combs. Specimens illustrating the manufacture of Combs, Picture Frames, and Card Cases from Tortoise Shell.

Tortoise shell is obtained from the carapace or back of the Hawk's-bill turtle (*Chelonia imbricata*). It possesses the valuable property of welding by heat, so that two pieces can be joined together.

*Compartments H, I, J, K, L.*

Series of specimens and Tools illustrating the manufacture of various kinds of Brushes from Hogs' Bristles and other materials.

Prepared by Mr Thomas Duncan, Edinburgh.

*Compartments M and N.*

Specimens of Plain and Dyed Aloe Fibre (*Agave americana*) and Cocoa-Nut Fibre.

Presented by Messrs Laycock and Sons, Sheffield.

Brushes made of various Vegetable Fibres.

WALL CASE, EAST SIDE OF GALLERY.

*Compartment A.*

Specimens illustrating the different stages in the Tanning of Leather, with the Materials and Tools used.

Presented by Mr T. Callender, Leith.

Machine Bands made of Preller's Patent Leather.

Presented by Preller's Patent Leather Company, London.

Russian Plaited Leather Boots.

Presented by His Excellency George Peterson.

Fine Boots of Uncurried Leather. Ornamental Slippers made by the Tartar women of Kasan.

Presented by the Russian Commission for the International Exhibition of 1862.

*Compartments B, C, D, E.*

Large series of specimens illustrating the manufacture of various kinds of Leather, including the *tawing* of White Leather, the pro-

## LEATHER—HORN—WOOLLEN FABRICS.

## WALL CASE.

cess of Dressing Oil or Wash Leather, Dyed Leathers, Morocco and Japped Leather, Ox and Cow Hides, &c.

Presented by Messrs E. & J. Richardson, Newcastle-upon-Tyne.

\*\*\* The Tanning and Dyeing materials belonging to Messrs Richardsons' series are shown in the Chemical Gallery.

Walrus, Hippotamus, and Bull-Neck Leathers, prepared for polishing purposes.

On the top of the Case there are specimens of fine Dyed Leathers for Furniture, Hatters' and Bookbinders' purposes.

*Arranged on the Wall above Compartments B, C, D, E.*

Series of specimens of Horns used in the Arts, including those of the Buffalo, Ox, Sheep, Antelope, and various species of Deer.

Specimens of Turtle Shell (*Chelonia Midas*).

Pair of Ivory Tusks.

Presented by the Royal Society of Edinburgh.

Skull of the Walrus (*Trichecus rosmarus*).

Boar's Skull.

Presented by Mr T. White, Edinburgh.

Three Horns of the Narwhal (*Monodon monoceros*).

## WALL CASE.

*Compartments F and G.*

Specimens illustrating the manufacture of Scotch Blankets.

Presented by Mr Charles Wilson Earlstoun.

Specimens illustrating the manufacture of Scotch Tweeds.

Prepared by Messrs P. & R. Sanderson, Galashiels.

Wool is a variety of hair covered with minute imbricated scales or serrations which can easily be seen under the microscope. It is this property which gives it its value for spinning, and especially for felting purposes. Short-stapled wool is used for the manufacture of woollen cloth; long-stapled wool, on the other hand, is used for worsted cloth. The processes of spinning the yarns for these two classes of goods are quite different, as the illustrations in the cases show.

*Compartments H and I.*

Royal Stuart Tartan Plaid and other Woollen Fabrics, with specimens illustrating the process of Spinning the Yarns employed for them.

Manufactured by Mr George Lees, Galashiels.

*Compartments J and K.*

Specimens of English Tweeds, Fancy Cloths, and fine Wool and Piece Dyed Cloths, manufactured at Leeds.

Presented by the Leeds Chamber of Commerce.

Specimens of "Shoddy" and "Mungo," and Cloths manufactured from them.

"Shoddy" is the waste produced in the manufacture of worsted goods,



## WOOLLEN FABRICS—HORSE HAIR.

## WALL CASE.

and "Mungo" is the waste produced in the manufacture of fine woollen cloths. Both names are now used to distinguish certain kinds of woollen rags as well. Specimens illustrating the manufacture of English Broad Cloth.

Presented by Messrs Littles, Leach, & Co., Britannia Mills, Leeds. Series of specimens of Waste Woollen Materials used in the manufacture of inferior Woollen Cloths.

Presented by Mr Henry Ludolf, Leeds.

*Compartments L, M, N, O.*

Specimens illustrating the manufacture of Felted Woollen Cloth, including Slipper Cloth, Printed Table Covers, Printed Carpets, &c. Presented by the Patent Woollen Cloth Co., Elmswood Mills, Leeds.

*Compartments N, O, P, Q.*

Specimens illustrating the manufacture of Brussels and Velvet-Pile Carpets.

Presented by Messrs Morton & Son, Kidderminster.

*On Wall above Cases containing Carpets.*

Turkey Carpet.

Presented by Mr J. Heukensfeldt, Delft.

*Compartments R and S.*

Specimens of All-Wool Merino, and Union Damasks, Curtains, Cloths, &c.

Presented by Messrs James Akroyd & Son, Halifax.

*Compartments T and U.*

Specimens of Merino, Cobourg, and Adelia Cloths.

Presented by Messrs A. & S. Henry & Co., Bradford.

Specimens of Genappe and Mohair Yarns.

Presented by Messrs Townend Brothers, Bingley, Yorkshire.

Specimens illustrating the Stages in the Spinning of Worsted Yarns, together with the Wools used in the Worsted Manufacture. (Arranged in the bottom shelves of Compartments R, S, T and U).

Presented by Messrs J. & W. Garnett & Co., Bradford.

## DESK CASE, EAST SIDE OF GALLERY.

*Compartments A, B, C, D.*

Specimens of Horse Hair in its natural state, drawn and dyed; and finished specimens of Hair Cloth, plain, figured, and in various colours.

Presented by Messrs Samuel Laycock & Sons, Sheffield.

Specimens of Human Hair and modes of dressing it. (On screens at ends of Compartments A and D).

Presented by Mr J. Koerber, 31 Cockburn Street, Edinburgh.

*Compartments E and F.*

Specimens of Feathers and Downs.

Presented by Messrs J. Heal & Son, London.

## QUILLS—FEATHERS—BONE—IVORY.

## DESK CASE.

Specimens illustrating the manufacture of Fly-Hooks. (On screen at end of Compartment E.)

*Compartment G.*

Specimens of Goose Quills, Swan Quills, and Crow Quills; Indian Belt of Quill Work; Porcupine Quills and Indian Bracelet of Porcupine Quill Work.

Feather Tippet.

Kerchief made of Cygnet Down (unfinished), from Nijni-Novgorod, Russia.

Presented by the Russian Commission for the International Exhibition of 1862.

*Compartment H.*

Two French Head Wreaths of Artificial Flowers made of Feathers. Feathers of the Adjutant Crane (*Ciconia argala*), prepared for ladies' head-dresses.

Frame containing Emu, Native Companion, and Albatros Feathers. (On screen at Compartment H.)

*Compartment I.*

Specimens of Sponges, Elephant's Tail, Riding Whip made from the horny stem of a Zoophite, &c.

*Compartment J.*

Specimens of Marbled Cow Hide prepared for bookbinding purposes, and copy of Baine's "History of Liverpool," richly bound in the same material.

Presented by Mr James Fraser, bookbinder, Liverpool.

*Compartment K.*

Specimens illustrating the manufacture of Glue.

Presented by Messrs J. & G. Cox, Gorgie.

Various kinds of Dutch and French Glue.

*Compartment L.*

Specimens of Plain and Ornamental French Gelatine.

*Compartment M.*

Whale's Teeth. Ruler and Fid made of Whale's Jawbone. Elephant's Tooth, and Box made from one. Recent and Fossil Ivory, and objects made from recent Ivory.

*Compartment N.*

Series of specimens illustrating various manufactures from Bone and Ivory.

Presented by Messrs F. Padmore & Sons, Birmingham.

Illustrations of the manufacture of Bone Buttons.

Presented by Mr John Barnsley, Birmingham.



WOOLLEN FABRICS.

DESK CASE.

*Compartments O and P.*

Series of specimens illustrating various manufactures from Horn, including Handles, Eye-glass, Frames, Lanterns, Spoons, &c.

*Arranged on Screens at Desk Case, Compartments I, L, M, and P.*

Series of framed Photographs, illustrating operations in Tanning and Currying Leather, taken from Messrs Bevington & Son's Works at Bermondsey, London.

Presented by the Messrs Bevington.

WALL CASE, SOUTH END OF FIRST GALLERY.

*Compartment A.*

Specimens of Printed and Embroidered Woollen Table Covers.

Presented by Mr Matthias W. Yates, 2 Wood Street, Cheapside, London.

Printed Tournay Cloths.

Presented by Messrs Akroyd & Son, Halifax.

*Compartment B.*

Specimens of Camels' hair Cloth—Russian manufacture.

Presented by the Russian Commission for the International Exhibition of 1862.

Embroidered Cloak of White Camels' Hair.

Presented by Mrs R. W. Thomson, 3 Moray Place, Edinburgh.

Egyptian Morning Coat of Camels' Hair.

Presented by Dr J. Ivor Murray, Hong Kong.

Series of specimens illustrating the printing of Mousseline de Laines.

Presented by Messrs T. Hoyle & Son, Manchester.

*Compartments C, D, E, F.*

Large series of specimens illustrating the manufacture of Alpaca and Mohair fabrics, including samples of the Wool in its natural state, the processes of combing and spinning, and examples of alpaca reps, poplins, cashmeres, embroidered cloths, mohair gloves, &c.

Presented by Messrs John Forster and Son, Black Dyke Mills, near Bradford.

Alpaca is the long, soft, and lustrous wool of the *Llama Pacos*, a creature which represents the camel in the new world. Mohair is the long silky wool which forms the fleece of the Angora goat, *Capra Angorensis*.

*Compartments G and H.*

Specimens of Cocoons from different breeds of the Silk worm, forming illustrations to a Monograph of the Cocoon by E. Daseigneur, Lyons, France.

Silk is a peculiar secretion from the body of the silk-worm (*Bombyx mori*). The animal draws this out into a long fine filament with which it forms its cocoon, enclosing itself within it at the same time. In the case of cocoons intended for the manufacture of silk, the pupa in the interior is killed

## SILK MANUFACTURE.

## WALL CASE.

by immersion in hot water before the silk is unwound. Other species of moths yield silk for manufacturing purposes, some of which are shown.

Large series of specimens showing varieties of Italian Silk-worm Cocoons.

Presented by the Italian Commission of the International Exhibition of 1862.

Varieties of Algerian Silk-worm Cocoons.

Presented by the Algerian Commission for the International Exhibition of 1862.

Frame in which the Silk-worms spin their Cocoons.

Presented by the Italian Commission of the International Exhibition of 1862.

Indian Silk-worm Tray.

Presented by Colonel Macdougall, Edinburgh.

Grecian Cocoons.

Presented by the Grecian Commission for the International Exhibition of 1862.

*Compartments H, I, J, K.*

Specimens of Raw and Thrown Silks for various purposes. (Arranged in lower division of these compartments.)

Presented by Messrs S. A. Wright & Co., Derby.

Silk-worm Cocoons and Raw Silk from different parts of the Russian Empire. (Arranged in lower portion of Compartments I and J.)

Presented by the Russian Commission for the International Exhibition of 1862.

Japanese Raw Silk.

Presented by Sergeant J. S. Galbreath, 31st Regiment.

Hungarian Raw Silk.

Series of Raw, Thrown, Dyed, and Woven Silks, illustrating the manufacture of damasks, brocades, brocatellas, tissues, and borders. Also specimens of Silk Machine Embroidery. Prepared by Messrs Houldsworth, Manchester. (Arranged in the upper divisions of Compartments I, J, K, and L.)

Portraits of her Majesty the Queen and H.R.H. Prince Albert, woven in silk.

Presented by Professor Archer.

Specimen of Coventry Silk-weaving-lines from "Lady Godiva."

Presented by Mr S. C. Hall, London.

Specimens of East Indian and Siamese Raw Silks. (Arranged in lower portion of Compartment K.)

*Compartment L—Lower Division.*

Specimens illustrating the process of combing and spinning Waste Silk.

Presented by Messrs J. Brocklehurst & Sons, Macclesfield.



## SILK—MODELS.

## WALL CASE.

Specimens of Dutch Silk Gauze for millers' purposes, and Silk Glacé for girls' head-dresses.

Presented by Messrs Le Grand & Belain, Haarlem.

## Compartment M.

Specimens of Indian Mushrooms and other mixed Silk Fabrics.

Silk Batik Handkerchief, from Java.

Silk Batik Scarf, from Java.

Presented by Mrs Thomson, Moray Place, Edinburgh.

Tussah or Tusseh Silk-worm (*Saturnia mylitta*), Cocoons, and Raw Silk. Moonga Raw Silk (*Antheraea Assama*). Mezankoorie Raw Silk (*Antheraea Mezankooria*). Eria Silk (*Attacus Cynthia*).

Presented by the Secretary of State for India, through Dr Forbes Watson.

Tussah Silk Cloth.

Presented by Mrs Gladstone, London.

Irish Silk Embroidered Cushion Cover.

Presented by Mr James Chalmers, Dublin.

Cocoons of *Attacus Cynthia*. Cocoons and Raw Silk of *Bombyx Cynthia*.

Presented by the Countess C. de Corneillan, Paris.

Cocoons of a Silk-producing Insect found on the Eucalyptus or Gum Trees of Australia.

Frame containing specimens of Black Silk Lace.

Presented by Mr W. Vickers, Nottingham. (On top of Case.)

## Table Case A.

Models of Machines used in the manufacture of Woollen Cloth, viz., Apperley's Feeder, Carder, and Condenser for Wool-Spinning; Scribbling Machine; Teazer and Patent Oiling Machine; and Willy or Devilling Machine.

## Table B.

Model of a Ribbon Loom with Jacquard Apparatus.

Specimens of fine Cotton Yarns. No. 2150 is the finest ever spun, and No. 700 is the finest ever woven.

Manufactured and presented by Messrs Houldsworth & Co., Manchester.

## Table Case C.

Models of a Milling Machine of Fulling Stocks for felting Woollen Cloth.

Shetland Wool Combs. Hand Carding-Machines, from Madeira. Distaffs.

## Upright Case D.

Specimens of Bobbins, Shuttles, Door Handles, Rings, and other Turnery. Prepared by Messrs John Dickson & Sons, Steeton, near Leeds.

Presented through the Science and Art Department, London.

## MODELS—COTTON MANUFACTURE.

## WALL CASE.

*On Top of Wall Case.*

Shetland Garter Loom, from Fair Isle.

Presented by Mr Johnston, Fair Isle, through the Rev. J. E. Cumming, Edinburgh.

Native Loom, with palm fibre, in the process of weaving, from Old Calabar.

Presented by the Rev. Zerub Baillie, Africa, Old Calabar.

Spinning Wheel.

Presented by Mr A. Kirkwood, Edinburgh.

Spinning Wheel, from Moorshedabad, India.

Churka for cleaning Cotton, from Gwalior.

## WALL CASE, WEST SIDE OF GALLERY.

*Compartment A.*

Specimen of a Cotton Plant from the United States.

Presented by Mr James Smith, St Vincent Street, Glasgow.

Specimen of a Cotton Plant from Alabama, U.S.

Presented by Mr Robert Burn, Edinburgh.

Wax Model of a Cotton Plant in Flower.

Cotton is the hairy or woolly covering of the seeds of several species of *Gossypium*. Its natural use is to protect the vitality of the seed by maintaining it at a proper temperature. The long-stapled Sea Island cotton of the United States is the finest for manufacturing purposes.

*Compartments A, B, C.*

Specimens of Raw Cottons from various countries. (In lower portion of compartments.)

Presented by Mr J. Fishwick Stead, Liverpool.

Series of specimens illustrating the successive stages in the spinning of Yarn from Egyptian and Sea Island Cotton.

Presented by Messrs J. and G. Knowles, Bolton.

Dutch Cotton Blanket.

Presented by Messrs L. and A. Schaap, Amersfoot, Holland.

Series of specimens illustrating the stages in the "Madder Style" of Calico Printing, including the bleaching process.

Presented by Messrs T. Hoyle & Son, Manchester.

*Compartments D and E.*

Series of specimens illustrating the methods of printing in the "Madder Style" and in "Steam Colours" on Calico. Also examples of printing in different colours and grounds from the same general pattern.

Presented by Mr Walter Crum, F.R.S., Glasgow.

Specimens illustrating the stages in the spinning of fine Cotton Yarn from Sea Island Cotton.

Presented by Messrs T. Houldsworth & Co., Manchester.



## COTTON—CALICO PRINTING.

## WALL CASE.

Specimens showing stages in the manufacture of Cotton Hose.  
Presented by Messrs Ward, Strut, & Sharp, Belper.

*Compartment F.*

Series of specimens illustrating the Dyeing and Printing of Turkey Red Calico, and of a Cotton Handkerchief with cochineal ground.  
Presented by Messrs Henry Monteith & Co., Glasgow.

Set of seven Hand Blocks, used for printing the different colours in a calico pattern. (The pattern is shown in a small frame.)

Presented by Mr Matthew Gray, Dalmonach Print Works, Vale of Leven.

Dyed Carded Cotton Laps and Sewing Thread.

Presented by Messrs Strutt & Co., Belper.

Specimens illustrating the Dutch method of Dyeing Turkey Red Yarn.  
(Shown in lower portion of Compartments F and G).

Presented by Mr J. A. Carp, Helmond, Holland.

*Compartment G.*

Batavian Batiks, and Imitations of same manufactured in Glasgow.

Presented by Mr Thomas M'Miching, Helensburgh.

*Compartment H.*

Chinese specimens of Cotton Spinning, and of Dyed and Printed Calicoes.

Presented by Patrick Dudgeon, Esq. of Cargen.

Specimens of Chinese Calicoes dyed various colours.

Presented by Mr E. F. Duncanson, Shanghai.

*Compartment I.*

Selection of Patterns of Calico Prints as prepared for use in different countries.

Presented by Messrs J. Pender & Co., Manchester.

*Compartment J.*

Specimens illustrating the manufacture of Gingham and other Cotton Fabrics, with the patterns produced in the weaving.

Presented by the Lancefield Spinning Company, Glasgow, through Mr J. Graham Smith.

Specimens of Indian Gingham, from the Collection at the India Museum, London.

Cotton Cloth, with woven patterns manufactured in Brazil.

Presented by the Brazilian Commission for the International Exhibition of 1862.

*Compartment K.*

Specimens illustrating the preparation and spinning of Flax grown in Suffolk and Norfolk.

Presented by Messrs Costerton & Naylor, Scole.

Flax is the material used in our linen manufactures, and is a strong

## FLAX—JUTE—HEMP.

## WALL CASE.

tenacious fibre obtained from the well-known flax plant (*Linum usitatissimum*). Fine linen was made by the Ancient Egyptians, a specimen of which can be seen in the Mummy Case, N.-E. Room.

## Compartment L.

Specimens of the stages in spinning and weaving of Flemish Flax.  
Presented by Messrs Marshall & Co., Leeds.

## Compartment M.

Specimens illustrating the preparation of Yarns from Russian Flax.  
Presented by Messrs Baxter Brothers, Dundee.

## In Lower Portion of Compartments K, L, M, N.

Series of standard examples of Riga Flax, with trade marks and specimens of different qualities of Russian Flax.

Presented by the Russian Commission for 1862.

Russian Linen Towels, made and embroidered by peasants.

Presented by his Excellency George Peterson, St Petersburg.

## On Top of Case.

Italian Garden Hemp in the Straw.

Hemp is the fibre obtained from *Cannabis sativa*. Like flax, it was used for making garments in ancient times. Some kinds of it can be made into cloth as fine as linen, but it is chiefly used for sail-cloths, sacking, and cordage.

## Compartments O and P.

Fine Italian Hemp, prepared.

Presented by the Italian Commission for the International Exhibition of 1862.

Specimens of Hemp from different countries.

Presented by Mr W. Horner, Liverpool.

Specimens of Russian Hemp and of Hemp Harness.

Presented by the Russian Commission for the International Exhibition of 1862.

## Compartments P and Q.

Specimens illustrating the manufacture of Jute Carpets, including the stages in spinning and dyeing the Yarn used.

Prepared by Messrs J. Neish & Co., Dundee.

Jute is a fibre which has only come into use of late years, and is obtained from the bark of two East Indian plants, *Corchorus capsularis* and *C. olitorius*, but chiefly the former species. It is coarser and not so strong as flax, but being cheaper, it is now very largely used to mix with flax, and also by itself, for certain kinds of fabrics.

Manilla Hemp (*Musa textilis*), and Mats made from it.

## Compartment R.

Leaves and Flowering Stem of New Zealand Flax (*Phormium tenax*).

Presented by Dr Lauder Lindsay, Perth.

## VEGETABLE FIBRES—INDIA RUBBER.

## WALL CASE.

Specimens of New Zealand Flax, showing the native mode of preparing it. Also Ropes, Cord, and Baskets made from it by the Maories.

Presented by Mr Peter Wilson, New Plymouth.

New Zealand Flax, and Cord made from it in England.

Presented by H.M. Commissioners of the Great Exhibition of 1851.

Specimens of China Grass (*Bahmeria nivea*), and Cloth made from it.

Presented by Mr J. G. Morison, Edinburgh.

Specimens illustrating the mode of spinning China Grass.

Presented by Messrs Marshall & Co., Leeds.

## Compartment S.

Collection of the Vegetable Fibres of Trinidad and British Guiana.

Presented by Sir William Hay Holmes, Commissioner for Trinidad and British Guiana, in the International Exhibition of 1862.

Pina Cloth and Gauze, from Manilla.

Presented by Mrs R. W. Thomson, 3 Moray Place.

Specimens of Vegetable Fibres, from the Mauritius.

Presented by Mr James Morris, late of Mauritius.

Specimens illustrating the manufacture of Kamptulicon. (Shown in a separate frame and case.)

Presented by Messrs Taylor, Harry & Co., London.

## DESK CASE, WEST SIDE OF GALLERY.

## Compartments A and B.

Specimens of India Rubber in the milky state in which it is obtained from the tree, *Siphonia elastica*.

Presented by the Brazilian Commission for the International Exhibition of 1862.

Series of specimens, showing different kinds of Raw and Prepared India Rubber, and articles manufactured from it.

Presented by Messrs Charles Macintosh & Co., Manchester.

## Compartments C and D.

Specimens of articles manufactured from Ebonite (hardened India Rubber).

Presented by Messrs S. W. Silver & Co., London.

Specimens of articles manufactured from Vulcanite (hardened India Rubber).

Manufactured by Messrs C. Goodyear & Co., London.

Illustrations of the manufacture of Elastic Web.

Presented by Messrs T. W. Hodges & Sons, Leicester.



## GUTTA PERCHA—BUTTONS—LACE.

## DESK CASE.

*Compartments E and F.*

Specimens of Belting, Washers, and Valves for Machinery; and of Boots and Shoes, manufactured of India Rubber.

Presented by the North British Rubber Company, Edinburgh.

*Compartments G and H.*

Specimens of manufactures from Gutta Percha, including the stages in preparing the Raw Material.

Manufactured by the Gutta Percha Company, London.

Gutta Percha is the dried milky juice of *Isonandra Gutta*, a tree found in the island of Borneo.

Specimens of Ballata Gum, a substance resembling gutta percha, formed from the milk of the Bully Tree (*Sapota Mullieri?*).

Presented by Mr J. P. Wright, Liverpool.

Specimen of Vegetable Leather, a substance formed of woven and felted fabrics, combined with India rubber, gutta percha, &c., and afterwards chemically with compounds of sulphur, lead, &c.

Presented by Messrs George Spill & Co., London.

*Arranged on the Screens at Compartments A, D, E.*

Four Designs for Shawls, composed of the indigenous Flora of Victoria, by Mr E. Bateman, Melbourne.

Presented by the Colonial Commission for the International Exhibition of 1862.

*On Screen at Compartment I.*

Diagrams showing the comparative lengths of the Staple of Cotton grown in different countries. (On screen.)

Prepared by Dr Forbes Watson, Government Reporter on the Products of India.

*Compartment I.*

Specimens illustrating the manufacture of Linen and Silk Covered Button; and also "Manton's Patent Composition" Buttons.

Presented by Messrs Dain, Watts, & Manton, Regent Works, Birmingham.

*Compartment K.*

Specimens illustrating the manufacture of Lamp and Candle Wicks.

Presented by Messrs J. Morgan & Son, Manchester.

*On Screen between Compartments L and M.*

Specimens of Lace.

Presented by Mrs Stirling of Kippenross, Dumblane.

Specimens of Swedish Lace.

Specimens of Flemish and Valenciennes Lace.

Presented by Madame P. Mabesoone et Sœurs, St André, near Bruges.

*Compartment M.*

Specimens showing different kinds of Weaving, on an enlarged scale.

FOOD COLLECTION.

DESK CASE.

*Compartment N.*

Specimens illustrating the Manufacture of Carriage Lace.

Presented by Messrs J. & J. Greig, Greenside Row, Edinburgh.

*Compartments O and P.*

Specimens of Plain and Figured Poplins, and of the materials of which they are made. Also specimens of Tabinets and Carriage Lace. The latter arranged on screen.

Presented by Messrs W. Fry & Co., Manufacturers, Dublin.

GREAT HALL—Upper Gallery, South Side.

FOOD COLLECTION.

UPRIGHT CASE ADJOINING STAIR.

*Compartments A, A.*

Selection of the Food Fishes of Great Britain.

*Compartments B, B.*

Selection of the Food Fishes of Canada.

*On Shelves above Stair Railing.*

Selection of the Food Fishes of Nova Scotia.

WALL CASE.

*Upright Compartments C, C, C, and D, D.*

Specimens of British Birds used as food.

*Desk Compartment C\*.*

Specimens showing the analysis or proximate constituents of 1 lb. of Beef and 1 lb. of Veal; Liebig's Extract of Meat, prepared by Harvey & Reynolds, Leeds; Russian Portable Veal Soup; Charqui or Jerked Beef, from Venezuela; Preserved Meat.

*Desk Compartments C\*\* and C\*\*\*.*

Illustrations of the manufacture of Gelatine, prepared by Messrs Cox of Gorgie; 1 lb. of Mutton Chop and 1 lb. of Pork, with constituents; preparations of Deer Sinews and of Elephant and Rhinoceros Hide, used as food in Siam; "Pemmican" or Dried Venison, from North America.

*Desk Compartments D\* and D\*\*.*

Pangolin Skin used as food in Siam; Domestic Fowl in model, with constituents; Cock's Combs prepared as food; Hen's Eggs, with constituents; various Eggs used as food.

*Desk Compartment E.\**

Edible Bird's Nests, from Siam. These are largely exported to China, and the tax imposed upon them forms a considerable item in the

## FOOD COLLECTION.

## WALL CASE.

revenue of Siam. The Chinese esteem them as a great delicacy, and pay highly for the best kinds. The nest is that of a small swallow, the *Hirundo esculenta*.

*Desk Compartment E\*\*.*

Soft Turtle Shells (*Chelonia virgata*), used as food in Siam; models of 1 lb. of Salmon and 1 lb. of Cod, with their proximate constituents; Salted Fish, from Siam; Preserved Fish, from North America.

*Upright Compartments E, E, E.*

Preserved Sword-Fish, Tunny, and Sardine, from Italy; Sterlet, from Russia; and Red Fish, from the Straits of Malacca.  
Series of specimens of Raw and Prepared Isinglass.

Presented by Mr J. Vickers, London; and others.

*Desk Compartment E\*\*\*.*

Specimens of Isinglass.

Presented by Mr J. W. Hart, London, and others.

"Botargo," a preparation from the roes of fishes, used as food by the Greeks and Egyptians; Fish Maws, the dried stomachs of fishes used as food in China, Japan, &c.

*Desk Compartments F\* and G\*.*

Specimens of Mollusca (shell-fish), used as food, chiefly presented by R. Macandrew, Esq. of Isleworth.

*Upright Compartments G, H.*

Specimens of materials employed to adulterate Food.

*Upright Compartments I, J.*

Specimens of various kinds of Tea, from China, Japan, Assam, Java, &c.

Presented by Messrs Phillips & Co., London.

Specimens of East Indian Teas,

Presented by the Secretary of State for India,

Specimens of Brazilian Teas,

Presented by the Brazilian Commission for the International Exhibition of 1862.

*Desk Compartment I\*.*

Proximate constituents contained in 1 lb. of Tea; specimens of Rare and Fancy Teas, including Brick Tea, Ball Tea, Cigar Tea, Lie Tea, Imperial Japanese Tea, &c.

Materials used for scenting Tea.

Drawing of the Tea Plan. (On top Case.)

*Desk Compartment J\*.*

Yerba do Maté, the Leaves and Twigs of *Ilex paraguayensis*, used as tea in Brazil.



FOOD COLLECTION.

WALL CASE.

Leaves of the Coffee Plant (*Coffea arabica*), prepared as tea, and used as such in Sumatra, Jamaica, &c.

Guarana, a substance prepared from the fruit of the tree *Paullinia sorbilis*, which grows on the banks of the Amazon, and used by the natives of that district as tea.

Kola Nuts, the fruit of *Sterculia acuminata*.

All the preceding substances used as tea contain *theine*, the active principle of tea.

Substances used as Substitutes for Tea, but not containing theine, including species of *Prinos*, *Eugenia*, *Angræcum*, *Ledum*, *Saxifraga*, *Stachys*, *Origanum*, *Mentha*, *Salvia*, &c.

*Upright Compartment K.*

Branches of the Coffee Plant (*Coffea arabica*), with Berries.  
Presented by Mr James Stones, London.

Specimens of Coffee from Ceylon, Jamaica, Costa Rica, &c.  
Presented by Messrs Moffatt & Co., Liverpool.

Coffee in the husk, and varieties of Coffee grown in Brazil.

Coffee in the husk, in the shell, and cleaned, from Costa Rica.

Pearl Coffee from Demerara River, Coffee from Liberia and from Gaboon.

Drawing of the Coffee Plant. (On top of Case.)

*Desk Compartment K\*.*

Specimens showing the proximate constituents in 1 lb. of Coffee.

Branch of Coffee Tree, from Costa Rica.

Coffee from Angola, Natal, Mozambique, West Indies, &c. True Mocha Coffee, from Bombay.

(Two Photographs of Coffee Plantations in India are hung on a screen in front of this Case.)

*Desk Compartment L\*.*

Various Seeds used as substitutes for Coffee.

*Upright Compartment L.*

Chicory Root (*Cichorium Intybus*).

Specimens showing the stages in the preparation of Chicory.

Presented by Messrs H. Thorne & Co., Leeds.

Specimens of Salep or Saloop, the root tubers of several orchidaceous plants. It was formerly, and still is to some extent, used as a breakfast beverage.

*Desk Compartments M\* and N\*.*

Specimens showing the proximate constituents of 1 lb. of Cocoa.

Varieties of Cocoa Seeds, and specimens illustrating the manufacture of Cocoa and Chocolate, including examples of the fruit (a capsule) and wood of the Cocoa Tree (*Theobroma Cacao*).

Presented by Messrs J. S. Fry & Sons, Bristol.

## FOOD COLLECTION.

## WALL CASE.

The specimens of the Cocoa Fruit and a Drawing are placed on the top of Case. A branch of the Cocoa Tree is hung upon a screen in front of this Case.

*Upright Compartment M.*

Drawing of Sugar Cane. (On top Case).

Series of specimens illustrating the manufacture of Sugar.

Presented by Messrs Macfie & Sons, Liverpool.

*Upright Compartment N.*

Varieties of Sugar, including that from the Beet-root, Maple, Apple, Sorghum, Milk, &c.  
Manna; Mannite; Honey.

*Upright Compartment O.*

Series of specimens of products from Potatoes, including Syrup, Grape, Sugar, &c.

Presented by Messrs Schoneveld & Westerbaan, Gouda.

Two specimens of Potato Syrup, from Moscow.  
Chinese Confectionery.

*Desk Compartment O\*.*

Confectioneries manufactured from Sugar.

Presented by Messrs Fortnum & Mason, London, and Mr A. Ferguson, Melbourne Place, Edinburgh.

*Desk Compartment P\*.*

Specimens of Liquorice Root (*Glycyrrhiza glabra*); and Paste, Sticks, and Pipes of Liquorice Juice.

Presented by Messrs R. Macandrew & Co., Frodsham.

Drawing of the Liquorice Plant. (On the top of Case).

Specimens of Hard Wheat, for Vermicelli, &c.

*Upright Compartment P.*

Varieties of Italian Pastes and Austrian Maccaroni Pastes.

*Upright Compartment Q.*

Varieties of Italian Maccaroni and Vermicelli. French Semolina. Arrowroot. Tous-les-mois. Sago. Plantain Meal. Flour of Sweet Potatoes, and other farinaceous substances.

*Desk Compartment Q\*.*

Glutin Flour and Bread. Italian and other Biscuits.

Vermicelli, Maccaroni, and Pastes, in various shapes, from Italy and Hungary.

*Upright Compartment R.*

Tapioca. Cassava, the sliced roots of *Janipha Manihot*; Cassava Flour and Bread. Yaruma, the pith of the Ita Palm (*Mauritia flexuosa*), used as a substitute for Cassava. Meal of the Bread Fruit (*Artocarpous incisa*). Palmyra Flour.

*Desk Compartment R\*.*

Specimens showing the proximate constituents contained in 1 lb. of Wheat in their right proportion by weight.

*Under the Desk Case here there are placed—*

African Hand Mill for grinding corn.

Presented by Dr Livingstone.

Hand Mill or Quern for corn—Faroe Islands.

Hand Quern, from Iceland.

Indian Hand Mills for corn.

*Desk Compartment S\*.*

Specimens showing the proximate constituents in 1 lb. of Bran, and also in 1 lb. of Barley. Varieties of Barley.

*Desk Compartment T\*.*

Specimens showing the proximate constituents in 1 lb. of Oats, and also in 1 lb. of Rye.

*Upright Compartments R, S, T.*

Collection of Spices, including Pepper of various kinds, Ginger, Cloves, Cinnamon, Nutmegs, &c.; with drawings of the plants yielding them, which are shown on the top of Case.

*Upright Compartment U.*

Various Condiments used with food, as Curry Powder, Chutnee, Japanese Soy, &c.

Drawing of Mustard Plants, Mustard Seed, &c. Specimens illustrating the manufacture of Table Mustard.

Presented by Messrs J. & J. Armistead, Leeds.

Specimens illustrating the manufacture of Table Vinegar from Malt.

Presented by Messrs Beaufoy and Co., London.

*Desk Compartment U.*

Rice in the ear and in the husk, and specimens showing the proximate constituents in 1 lb. of Rice; specimens of Maize or Indian Corn.

*Desk Compartment V\*.*

Specimens showing the proximate constituents in 1 lb. of Maize or Indian Corn; preparations of Indian Corn.

Specimens of Sorgho (*Sorghum saccharatum* and *Sorghum vulgare*) in the ear.

*Upright Compartment V.*

Specimens of Essences and other Condiments used for flavouring food.

Presented by Mr John Mackay, George Street, Edinburgh.

*Upright Compartment W.*

Specimens of Vanilla, the pods of several species *Vanilla*, a substance highly valued for flavouring confectionery, chocolate, and some kinds of spirits.



*Desk Compartment W\*.*

Varieties of Millet, and specimens showing the proximate constituents in 1 lb. of Millet; Seed of the *Chenopodium Quinoa*, a common article of food in Peru (an entire plant is shown in a jar on top of case); and of the Water Rice of Canada, *Zizania aquatica*.

*Upright Compartment X.*

Specimens of Herbs used for flavouring Food.

*Desk Compartment X\*.*

Specimens showing the proximate constituents in 1 lb. of Peas and in 1 lb. of Beans.

*Desk Compartment Y\*.*

Specimens showing the proximate constituents in 1 lb. of Lentils. Dhol or Thoravi (*Cytisus cajan*), used as food through India.

*Desk Compartment Z\*.*

Ground Nuts, or Earth Nuts, the legumes of *Arachis hypogæa*. Specimens showing the proximate constituents in 1 lb. of Buckwheat.

*Upright Compartments Y, Z.*

Series of Preserved Fruits and Vegetables.

Presented by Messrs Batty and Co., London.

Preserved Vegetables.

Presented by Messrs Fortnum, Mason, and Co., London.

## CASE ON END OF GALLERY.

*Desk Compartments A\*, B\*, C\*.*

Series of models and specimens of Tropical Fruits, among the most interesting of which are the Cocoa-Nut in its unripe and ripe state; the Plantain (*Musa parvifoliacea*), largely used as food in the tropics; the Bread Fruit (*Artocarpus incisa*) of the Polynesian Islands, and Biscuits made from it; the Jack Fruit (*Artocarpus integrifolia*); the fruits of the Orange Family; the Mangosteen (*Garcinia Mangostana*) of the Indian Archipelago, perhaps the most delicious of fruits; the Mango (*Mangifera indica*) of India; the Lichi and Longan (species of *Nephelium*) of China, &c.

Models of British Fruits.

*Upright Compartments A and B.*

Series of Preserved Fruits and Nuts and Candied Flowers.

Presented by Messrs Fortnum, Mason, & Co., London.

*Upright Compartments C, C.*

Specimens of various Ceylonese Fruits.

Presented by the Ceylonese Commission for the International Exhibition of 1862.

Varieties of Olives, from Italy.

Edible Fungi, from Italy and France.

Fruits and preparations of Fruits eaten in Egypt.

*On Top of Case.*

Specimens of the Avocado Pear.

Clusters of the Currant Grape.

Presented by the Commissioners for Corfu at the Exhibition of 1862.

## TABLE CASE.

*Compartment D.*

Models of the Sweet Potato (*Convolvulus Batatas*) and the Yams (species of *Dioscorea*); specimens of Yam Flour; and model of *Colocasia cucullata*. All these are tropical roots, more or less resembling the potato.

Models of Vegetables used as food. It is intended to have specimens showing the proximate constituents of all these, but, for the present, there is only room for the following being done in that way:—

*Compartment E.*

1 lb. of Turnips (model), with specimens showing the proximate constituents in same; specimens of compressed and desiccated Potatoes; Potato Arrowroot, &c.

*Compartment F.*

1 lb. of Potatoes (model), with specimens of proximate constituents.

1 lb. of Carrots (model), with specimens of proximate constituents.

*Compartment G.*

1 lb. of Parsnips (model), with specimens of proximate constituents.

1 lb. of Jerusalem Artichokes (model), with specimens of proximate constituents.

*Compartment H.*

Preserved Vegetables for use at sea, prepared by Messrs Chollet & Co., Paris.

Specimens of different parts of Plants used as food, but which are rather curiosities than staple articles of diet.

*Compartment I.*

Specimens of Fungi used as food, including Mushrooms, Truffles, Morels, Native Fungus Bread, *Mylitta Australis*, &c.; models of Edible Fungi.

Sea-weeds and Lichens used as food.

*On Screen above Flat Case.*

Coloured Lithographs of various Vegetables.

*Upright Case J.*

Contains specimens of various kinds of Spirits, Liqueurs, and Wines.

Also a model of a Malt Distillery for making Whisky.

Presented by Mr J. Ross, Teaninich, Ross-shire.

*Under the Wall Case, opposite this case of spirits, there are shown—*  
Two Kava Barks, used by the Polynesian Islanders for preparing their national beverage, called Kava. This is an intoxicating drink, prepared by chewing the roots of a species of pepper, *Piper methysticum*, and then pouring water on the masticated mass in a bowl like those shown.

Presented by Miss Hoole, London.

#### FLAT TABLE CASE.

##### *Compartments K and L.*

Specimens of Nuts, including the Brazil Nuts with capsules, Sapucaia Nuts with inwards, SOLEA or Butter Nuts, Stone Pine Nuts and Coconuts, Chilian Pine Seeds, Walnuts, Chestnuts, Almonds, and Palm Nuts of various kinds.

##### *Compartments M and N.*

Candied or Crystallised Fruits, prepared by boiling in syrup; imitations of Fruits in sugar, &c.

Prepared by Messrs Fortnum, Mason, & Co., London.

##### *Compartment O.*

Dika-Nuts (*Mangifera indica*), and Dika Bread prepared from them. Used as food by the natives of the Gaboon district of Equatorial Africa.

Specimens showing the proximate constituents in 1 lb. of Carob Beans (*Ceratonia siliqua*).

##### *Compartment P.*

Specimens of Table Salt and of other mineral substances in food. Also specimens of the Acids found in fruits, &c.

##### *On a Separate Table.*

Model of a Cocoa Plantation, River Saramacca, Surinam.

Lent by Mr Rogers, 2 Hillside Crescent.

#### TABLE CASE.

##### *Compartments Q, R, S, T.*

Specimens of Tobacco and its proximate constituents—Opium, Churru, Bang, and other narcotics: Betel Nuts, Gambir, &c.

##### *Upright Case U.*

Collection of Tobacco Pipes and Snuff Boxes, from various countries.

### GREAT HALL—North Side of Upper Gallery.

#### CASE ADJOINING STAIR LANDING.

##### *Compartments A, A.*

Specimens of Materials used in Perfumery, including Essential Oils, Scented Fats, Gums, Roots, Fragrant Woods, Animal Perfumes, &c.

Presented by Messrs Fiesse & Lubin, New Bond Street, London.

##### *Compartments B, B.*

Essential Oils, Barks, Roots, &c., used in perfumery.



*Upright Table Case C.*

Apparatus used in preparing Perfumery, consisting of a Lavender Still,  
"Chassis en Verres" for preparing scented fats, "Chassis en Fer," &c.

WALL CASE NEXT STAIR LANDING.

These cases contain specimens of materials used in Dyeing and Tanning; of various Vegetable and Animal Oils, including the substances from which they are prepared; of Gums, Resins, &c.

The remaining portion of the cases in this Gallery, which have not yet been properly arranged, contain a series of specimens obtained chiefly from the French colonies.

Presented by the Emperor of the French, through the Science and Art Department.

UPPER GALLERY—WALL CASE ON EAST SIDE.

*Compartments A and B.*

Cells of the different kinds of Galvanic Batteries. Smee's Galvanic Battery.

Experimental Galvanic Batteries, made in 1828-29, by the late Mr K. T. Kemp of Edinburgh.

Presented by Messrs Kemp & Co., Edinburgh.

Electric Fish, *Malapterurus binensis*.

Early form of the German Electrical Machine.

Presented by the late Professor George Wilson, Edinburgh.

Early form of the Voltaic Pile.

Early form of Apparatus for decomposing Water by the Electrical Current.

Presented by Professor Lyon Playfair, C.B.

Modern Apparatus for decomposing Water by the Electrical Current.

Dissected Electric Coil Machine.

Presented by Mr William Hart, Edinburgh.

Leyden Jar.

Electrophorus Plate.

Electro-Magnet Machine.

Electric Clock, with separate Pendulum.

"Magnetic Engine," driven by an electrical current.

Model to illustrate the Action of the Electric Telegraph.

Telegraph Indicator, showing how the needle is worked.

Part of Cooke and Wheatstone's first Working Telegraph. Specimens of different Telegraph Cables, Insulators, &c.

Presented by Mr R. S. Culley, Edinburgh.

Specimens showing the Construction of the First Atlantic Telegraph Cable.

Presented by the Atlantic Telegraph Company of 1857.

Model of a Telegraph Pole with Ebonite (india rubber) Insulators.

Presented by Messrs S. W. Silver & Co., London.

*Compartments E and F.*

Double Barrelled Air-Pump, early form.

70 GREAT HALL—WALL CASE ON EAST SIDE OF UPPER GALLERY.

Pneumatic Trough, used by Dr Joseph Black in the collection of fixed air (carbonic acid), of which he was the discoverer, and other gases.  
Balances employed by Dr Joseph Black in his experiments.  
Blowpipe Bellows, invented by Sir Humphrey Davy.  
Presented by Professor Lyon Playfair, C.B.

*Compartments G and H.*

Retorts, Receivers, Flasks, and other Glass Vessels for chemical purposes, made at Leith during the latter half of last century. These were used by Dr Joseph Black in his experiments, and show the rude vessels with which chemists worked at that time.

Presented by Professor Lyon Playfair, C.B.

Specimens of various kinds of Porcelain Vessels for chemical purposes.  
Manufactured and presented by Messrs Minton & Co., Stoke-upon-Trent.

Wedgwood Ware Mortar and Evaporating Dish.

*Compartments I and J.*

Portable Furnaces, Crucibles, &c., of fine clay, used for enamelling, assaying, and refining. Plumbago Crucibles, used for melting gold, silver, and other metals.

Presented by the Patent Plumbago Crucible Company, Battersea Works, London.

**French Fire-clay Crucibles.**

Presented by the Science and Art Department.

**Russian Fire-clay Crucibles.**

Presented by the Russian Commission for the International Exhibition of 1862.

**Two Patent Water Filters.**

Presented by the Silicated Carbon Filter Company, London.

*Compartments K and L.*

Specimens of Instruments and Apparatus for producing Light.  
Flint and Steel Mill, formerly used for producing Light in mines.

The Davy, Stephenson's, and other Miners' Lamps.

Presented by Mr Henry Watson, Newcastle-upon-Tyne.

**Night Lamp and Clock.**

Patent Fire Annihilator, acting by the production of a jet of carbonic acid and steam.

Presented by H. M. Commissioners of the Great Exhibition of 1851.

Taylor and Grimshaw's Pneumatic Fire Alarm and Ventilation Governor.

Presented by Professor Archer.

**Dr Nooth's Carbonic Acid Apparatus.**

Presented by Mr P. Stevenson, Edinburgh.

**Garage's, or Portable Aerator.**

Presented by Mr Baildon, Edinburgh.

**Instrument called Cartesian Imp.**

**Various kinds of Thermometers.**

Comparative Thermometer, and an Aethrioscope.

Presented by Mr James Bryson, Edinburgh.

Clarke's Hydrometer. Miller and Adie's Hydrometer. Richardson's Saccharometer.

Chinese Mariners' Compass.

Small Chinese Lever Balance for weighing.

Kaleidoscope and Debusscope.

Two Inhalers for chloroform, ether, &c.

Presented by Mr P. Stevenson, Edinburgh.

Small Model of a Steam Engine.

Apple-peeling Machine.

*On separate Tables.*

Model of a Coal Gas-Work. The Retorts and Purifiers are seen on lifting the hinged portions of the roofs.

Constructed by Mr John Young, Dalkeith.

Model of an Insulating Gas Condenser.

Presented by Mr John Young, Dalkeith.

Model of a Gas Retort Bench.

Presented by Mr Addison Potter, Newcastle-on-Tyne.

CHEMICAL SPECIMENS.

*Note.*—The Chemical Collection contains specimens of the elementary bodies, of their more important compounds, and of products from the different stages of the chief chemical processes, conducted on a large scale, so as to illustrate, as far as possible, the application of Chemistry to the Arts.

*Compartment A.*

Sealed Jar of Oxygen Gas, and specimens of the materials used as the sources of oxygen.

Sealed Jar of Hydrogen Gas, and specimens of the materials used in its preparation.

Carbon in its various forms, as Diamond, Plumbago or Graphite, Charcoal, Coke, Lamp-black, China Ink, &c.

Liquefied Carbonic Acid Gas, prepared by the late Mr K. T. Kemp, Edinburgh.

*Compartment B.*

Sealed Jar of Nitrogen Gas: Nitric Acid.

Phosphorus, White and Red Amorphous, and specimens illustrating its manufacture.

Presented by Mr A. Albright, Oldbury, Birmingham.

Illustrations of the manufacture of Lucifer Matches from Hungary; and specimens showing the preparation of Amadou or German Tinder, from the fungus *Polyporus fomentarius*, for the manufacture of fuses.

*Compartment C.*

Specimens illustrating the manufacture of Safety Matches, Wax Vestas, and other fire producers, prepared with Red or Amorphous Phosphorus.

Presented by Messrs Bryant and May, Fairfield Works, Bow, London.



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*Compartment D.*

Fine specimen of artificially Crystallised Sulphur, prepared from the Bisulphide of Carbon by the late Mr K. T. Kemp, Edinburgh.

Specimens of Native Sulphur, from different countries.

Specimens of Impure and Refined Sulphur, from Swozowice, in Galicia, Austria.

Presented by the Austrian Commission for the International Exhibition of 1862.

Iron Pyrites or Sulphuret of Iron, used as the source of sulphur in the manufacture of sulphuric acid.

Liquefied Sulphurous Acid, prepared by the late Mr K. T. Kemp, Edinburgh.

*Compartment E.*

Specimens illustrating the manufacture of Sulphuric Acid.

Presented by Dr T. Richardson, Newcastle upon-Tyne.

Specimens illustrating the manufacture of Sulphuric Acid.

Presented by Messrs Tennant & Co., St Rollox, Glasgow.

*Arranged along Railing of Gallery.*

Model of a Sulphuric Acid or Oil of Vitriol Manufactory.

Constructed by Dr Richardson of Newcastle.

Specimens of Iron and Copper Pyrites, from different countries, used in the manufacture of sulphuric acid.

Presented by Messrs Gaskell, Deacon, & Co., Warrington.

WALL CASE.

*Compartment F.*

Varieties of Silica, as Rock Crystal, Flint, Sand, &c.

Boron, Boracic Acid, and Borates.

*Compartment G.*

Liquefied Chlorine Gas, prepared by the late Mr K. T. Kemp, Edinburgh.

Specimens illustrating the manufacture of Chloride of Lime by the use of chromium.

Presented by Mr James Shanks, St Helen's, Lancashire.

Specimens illustrating the manufacture of Chloride of Lime by the use of oxide of manganese.

Presented by Messrs Tennant & Co., St Rollox, Glasgow.

Mineral Water from Tenbury, Worcestershire, with the bromine and salts extracted from it.

Presented by H. M. Commissioners of the Great Exhibition of 1851.

Fluor-spar.

*Compartment H.*

Specimens of Iodine.

Iodine, Iodide of Potassium, Chloride of Potassium, and other products from kelp or burned sea-weed.

Bromine, Bromide of Potassium, Magnesia, and other products from Bittern, the residual liquor after the separation of common salt from sea-water.

Presented by Messrs J. Ward & Co., Glasgow.

Balard's Sea-Water Products.

Presented by H. M. Commissioners of the Great Exhibition of 1851.

*Compartment I.*

Potassium, Caustic Potash, Crude and Refined Carbonate of Potash.

Potash obtained from Coffee Husks.

Fine Crystals of Nitrate of Potash, from Cologne, Prussia.

Bitartrate of Potash and Rochelle Salt.

Fine Crystals of Chlorate of Potash, manufactured by Mr J. E. Sturge, Birmingham.

Specimens illustrating the manufacture of Gunpowder.

Presented by Mr F. A. Abel, Director of the Chemical Department, Woolwich Arsenal.

*Compartment J.*

Specimens illustrating the manufacture of Soda.

Presented by Messrs Tennant & Co., St Rollox, Glasgow.

The manufacture of Soda is perhaps the most important of all the Chemical Arts. It is now almost entirely made from common salt, by a process invented by Leblanc in 1794, which, notwithstanding the great advances made in chemical science since that time, is still practised without any important alteration.

Specimens of Egyptian Natron or Trona (sesquicarbonate of soda).

Specimens illustrating the refining of Nitre (nitrate of soda).

Caustic Soda Crystals.

Presented by Messrs Gaskell, Deacon, & Co., Widnes Dock, Warrington.

*Compartment K.*

Sodium.

Crystallised Rock Salt (chloride of sodium), Transparent Slab, and other specimens of Rock Salt. Common Salt from different countries.

Specimens of different kinds of Common Salt, for table and other uses, from Droitwich.

Presented by Messrs Clay and Newman.

Hyposulphite of Soda, impure and purified.

Presented by the Walker Alkali Company, Newcastle-upon-Tyne.

*Arranged along the Gallery Railing.*

Specimens illustrating the Soda manufacture.

Presented by Messrs Gaskell, Deacon, & Co., Warrington.

*Compartment L.*

Chloride of Ammonium, Sulphate, Nitrate, Phosphate, and other Salts of Ammonia.

Specimens illustrating the manufacture of Sal-Ammonia, Chloride of Ammonium, from the ammoniacal liquor of gas-works.

Presented by the Bonnington Chemical Company, Edinburgh.

74 GREAT HALL—WALL CASE ON EAST SIDE OF UPPER GALLERY.

Lithium and Carbonate of Lithium.

Strontium and its Salts.

Barium and its Salts.

*Compartment M.*

Calcium. Chloride of Calcium. Varieties of Sulphate of Lime.  
Varieties of Carbonate of Lime. Specimens of Phosphate of Lime  
(Apatite).

Specimens illustrating the manufacture of Hyposulphite of Lime from  
soda waste.

Presented by the Jarrow Chemical Company, South Shields.

*Compartment N.*

Magnesium. Magnesia. French Chalk (silicate of magnesia).  
Specimens illustrating the manufacture of Aluminium.

Presented by Messrs Bell Brothers, Newcastle-on-Tyne.

Varieties of Alumina, including Emery or Corundum.

Cryolite (double fluoride of aluminum and sodium). China Clay  
(silicate of alumina).

Fine Crystal of Ammonia Alum.

Presented by Messrs J. Wilson & Sons, Hurlet.

Specimen of Native Alum, from the Caucasus.

Presented by the Russian Commissioners for the International  
Exhibition of 1862.

Specimens of Turkish Native Alum.

*Arranged on Table Case in Front of Gallery.*

Specimens illustrating the manufacture of Alum. Section of a tub of  
Crystallised Alum.

Presented by Messrs J. Wilson & Sons, Hurlet, Glasgow.

Small Tub of Crystallised Alum cut open to show its internal appear-  
ance.

Presented by H.M. Commissioners of the Great Exhibition of  
1851.

Sea-Weed Products.

Presented by the British Sea-Weed Company, through Mr  
Stanford.

*Compartment O.*

Salts of Uranium.

Cadmium. Sulphuret of Cadmium.

Nickel. Oxide of Nickel.

Cobalt. Oxide of Cobalt. Cobalt Colours.

Zinc. Oxide of Zinc. Native Carbonate of Zinc. Other Salts of  
Zinc.

*Compartment P.*

Native Black Oxide of Manganese. Wad or Bog Manganese Ore.

Chromic Iron Ore. Oxide of Chromium.

Chrome Yellow (chromate of lead).

Crystals of Bichromate of Potash.



WALL CASE—WEST SIDE OF GALLERY.

*Compartment A.*

Iron. Oxides of Iron. Salts of Iron.

Finely Crystallised specimens of Copperas (sulphate of iron).

Presented by Mr J. Wilson, Hurler Alum Works, Glasgow.

Specimens of various kinds of Iron Ochres.

*Compartment B.*

White Arsenic (arsenious acid) obtained from Cornish tin ores. Finely crystallised specimens of Arsenious Acid, prepared by Mr J. Davies from Arsenical Copper Pyrites. Realgar (bisulphuret of arsenic). Orpiment (tersulphuret of arsenic). German specimens of Arsenious Acid, Realgar, &c. Native Sulphuret of Antimony. Tartar Emetic (tartrate of potash and antimony).

Tin. Oxide of Tin.

Chlorides of Tin and other Tin Salts prepared for dyers and calico-printers.

Presented by Messrs R. and J. Garroway, Glasgow.

*Compartment C.*

Copper. Oxide of Copper. Salts of Copper.

Brunswick Green (oxychloride of copper).

Bismuth. Nitrate of Bismuth.

Lead. Litharge (oxide of lead).

Series illustrating the manufacture of White Lead (carbonate of lead) and Red Lead (oxide of lead).

Presented by Messrs Lock & Blackett, Newcastle-on-Tyne.

Finely Crystallised specimen of Acetate of Lead. Other specimens of Acetate of Lead. Oxychloride of Lead.

*Compartment D.*

Silver and its Salts.

Gold. Chloride of Gold.

Platinum. Chloride of Platinum.

Mercury. Oxide of Mercury. Salts of Mercury.

Specimens illustrating the manufacture of Vermilion (sulphide of mercury), from Idria.

Presented by the Austrian Commission for the International Exhibition of 1862.

*Compartment E.*

Specimens of various kinds of Pigments, including native and artificial Ultramarine.

*Compartment F.*

Pyroxylic Spirit, Acetic Acid, Acetates and other products, from the destructive distillation of wood.

Presented by Messrs Turnbull & Co., Glasgow.

76 GREAT HALL—WALL CASE, WEST SIDE OF UPPER GALLERY.

Specimens illustrating the manufacture of Oxalic Acid from sawdust.  
Presented by Messrs Roberts, Dale, & Co., Manchester.

Gum. Starch. Sugar.

Specimens of British Gum (dextrine) and Gum substitutes for calico-printers.

Presented by Mr James Laing, Manchester.

*Compartment G.*

Products of the destructive distillation of Wood similar to those in Compartment F, but more detailed.

Presented by Messrs Hirst, Brook, and Tomlinson, Leeds.

Specimens illustrating the manufacture of Gun Cotton for blasting purposes.

Presented by Messrs T. Prentice & Co., Stowmarket.

*Compartment H.*

Specimens illustrating the manufacture of Soap.

Presented by Mr James Mellis, Prestonpans.

Specimens illustrating the manufacture of Soap, with alkali from kelp ley. Specimen of Soap made in Paisley about 90 years ago.

Presented by Mr W. M'Kean, Paisley.

Spanish Brown Soap, Castile Soap, and Olive Oil Soap. Kazan Soap. Transparent Soap. Toilet Soaps.

Specimens illustrating the recovery of Grease from spent Soft-Soap Suds.

Presented by Messrs J. Foster & Son, Black Dyke Mills, near Bradford.

Russian Tallow and Stearic Acid.

*Compartment I.*

Specimens illustrating the manufacture of Candles from Palm Oil. Also specimens of Vegetable Tallow, Vegetable Wax, &c.

Presented by Price's Patent Candle Company, Vauxhall, London.

Stearine Candles, from Russia and Brazil. Candles made of the Wax of the Carnahuba Palm, from Brazil.

Fine Specimen of Crystallised Spermaceti.

*Compartment J.*

Products from Rangoon Petroleum, including lubricating oil, burning oil, naphtha (Sherwoodole), paraffin, and paraffin candles.

Presented by Price's Patent Candle Company, London.

Similar series, including the Pitch and Coke obtained in the refining process.

Presented by Mr J. Shanks, St Helen's.

Products from the Crude Naphtha or Petroleum, from Baku, on the Caspian Sea, including burning oil, a light naphtha, crude paraffin, and paraffin candles.

Presented by the Russian Commission for the International Exhibition of 1862.

Mineral Oils for burning, from springs in America and Siberia.  
Heavy and Light Photogen (naphtha) and Paraffin Candles, obtained from German brown coal or lignite.

Presented by Herr M. Durre, Glasgow.

Varieties of Paraffin made in 1855.

Presented by Messrs W. Brown & Co., Glasgow.

Products from Boghead Coal or Torbanehill Mineral, including light and heavy paraffin oil, light naphtha, and a large block of pure paraffin.

Presented by Mr James Young, Bathgate.

Mr Young was the first to obtain paraffin oil and paraffin from coal on a large scale. He took out his patent in 1850, and distilled these products from 1850 to 1865 from the Boghead coal (which yields about 120 gallons of crude oil per ton. Carboniferous shale is now used by preference to obtain paraffin and paraffin oil. (*See specimens in Fuel Series, ground floor of this Hall*).

#### *Compartment K.*

Pitch from Fir Wood.

Coal Tar, Ammoniacal Liquor, and other products from coal gas-works. Naphthaline, Rosolate of Lime.

Products obtained from Coal Tar or Gas Tar, including benzole, naphtha, pitch oil, coke oil, and pitch coke.

Presented by the Bonnington Chemical Company, Edinburgh.

Light and Heavy Shale Oils, obtained from Kimmeridge Shale.

Presented by H.M. Commissioners of the Great Exhibition of 1851.

This was the first burning oil manufactured in Great Britain from shale. It was abandoned on account of the disagreeable smell of the oil.

Light and Heavy Oil, obtained from a curious Brazilian shale of a light brown colour.

Presented by Dr Edwards, Liverpool.

Volatile Hydrocarbons, obtained from American petroleum.

Presented by Dr E. Ronalds, Bonnington Chemical Works.

Specimens of rare Volatile Bases obtained from coal tar.

Presented by Mr C. Greville Williams.

Native Bitumen or Ozokerite, found in Binny Quarry, near Linlithgow; also Candles and Ornaments made of it.

Chiefly presented by Mr D. Lind, Edinburgh.

Bees' Wax. Wax Candles, including Russian church and bridal candles, the latter curiously ornamented.

Products of the destructive distillation of Peat. Specimens of Native Mineral Tar, Asphalte, &c.

#### *Compartment L.*

Series of specimens illustrating the manufacture of the Aniline or Coal Tar Dyes, including the mordants used in fixing these colours.

Aniline purple, various shades of which have been so extensively used of late years, was discovered and patented by Mr W. H. Perkin in 1856.

Presented by Messrs G. F. Perkin & Son, London.



78 GREAT HALL—WALL CASE, WEST SIDE OF UPPER GALLERY.

Carbolic Acid and Carbozotic or Picric Acid prepared from coal tar.  
Presented by Professor Crace Calvert, Manchester.

*Compartment M.*

Specimens of the materials used in the bleaching and dyeing processes of the Tweed Cloth manufacture.

Specimens of the materials used in the bleaching, printing, and dyeing processes of Calico Printing.

Presented by Messrs J. Hoyle & Son, Manchester.

Specimens of Orchella Weed, and of Cudbear and Archil prepared from it.

Presented by Messrs J. Robinson & Co., Huddersfield.

Alumina and Lime Lakes, called Purple Lake and French Purple, prepared from archil, and used in calico-printing.

Presented by Professor Crace Calvert, Manchester.

Specimens of Indigo.

Presented by Messrs Laing and Merriden, London, and Dr Hunter, Madras.

Specimens of the Extract and of the Sulphate of Indigo.

Presented by Messrs Hirst, Brook, & Tomlinson, Leeds.

Specimens illustrating the manufacture of Murexide or Roman Purple from Guano.

Presented by Mr R. Rumney, Manchester.

Finely Crystallised specimen of the Yellow Prussiate of Potash, and illustrations of the process of its manufacture.

Presented by Messrs Crook & Mackinnon, Manchester.

*Compartment N.*

Series of specimens of the materials used in tanning and dyeing Leather.

Presented by Messrs C. & J. Richardson, Newcastle-upon-Tyne.

Tanning Material, and Liquors prepared from them.

Specimens of Tannic and Gallic Acids.

Presented by Mr David Brown, Edinburgh.

Tartaric and Citric Acids, and some of their compounds—Aloin, Codeine, Cholesterin, Furfurin, Bitter Almond Oil, Ceanothic Ether, &c.

Specimens of Albumen.

*Compartment O.*

Mineral Waters.

The Cases situated in the North End of this Gallery contain a collection of Materia Medica, the arrangement of which is not completed.

## OLD BUILDING.

*In Passage between Old and New Buildings.*

Entire sections of some Trees of large size, including Mountain Elm and Cedar grown in Scotland, Douglas Pine from Vancouver, &c.

### ROOM I.

EAST SIDE, WALL CASE A.

Specimens of Canadian Woods.

Presented by Mr E. Logan and others.

WALL CASE B.

Specimens of Ornamental Woods.

Presented by Messrs Bryde & Son, Liverpool.

Specimens of the Woods of Jamaica and Trinidad.

Presented by Mr J. Dickson and Mr G. H. Girle, Edinburgh.

WALL CASE C—SIDE OF STAIR.

Part of the series of the Woods of Trinidad.

Part of the series of Canadian Woods.

CENTRE CASE D.

Series of specimens of the Woods of Trinidad and British Guiana.

(Around the base of this Case there are placed some large specimens of Canadian Woods.)

SHELVES ON SOUTH WALL.

Specimens of Woods grown in Great Britain.

Collected by Messrs P. Lawson & Son.

Specimens of French Colonial Woods.

Presented by the Science and Art Department.

OBLONG CASE E.

Specimens of Walking Sticks, and of the Woods they are made from in the unprepared state.

Presented by Messrs Hovenden & Sons, London.

DESK CASE ON NORTH SIDE OF ROOM.

*Compartment I.*

Specimens of various Woods coloured with a mahogany stain.

Presented by Mr John Lamont, Edinburgh.

*Compartment J.*

Fine Specimen of Letter Wood, from British Guiana.

Specimens of Bird's Eye Maple, in the rough state and planed, from North America.

IN A GROUP AT END OF CASE K.

Specimens of Fir Wood Piles from Granton Pier, destroyed by *Limnoria terebrans*, a minute crustacean.

Section of a Creosoted Fir Wood Pile unharmed after 12 years' exposure in the sea at Leith.

Section of a Pile of Greenheart, *Nectandra Rodiei*, a wood grown in Jamaica which resists the attack of destructive animals like the *Limnoria terebrans*.

#### OBLONG CASE K.

Specimens of Building Stones from various parts of Scotland, including granites, sandstones, and limestones.

*In Case G, and on Shelves under it, there are—*

Polished specimens of Cornish Serpentine.

Presented by the Lizard Serpentine Company.

Specimens of Cornish Porphyries, Granites, and Elvans.

Presented by H.M. Commissioners of the Great Exhibition of 1851.

#### DESK CASE H.

Set of Concentric Cylinders cut out of a block of Sandstone by means of cylindrical iron cutters. Used to form into filters.

Presented by Messrs J. & T. Hall, Derby.

*On Shelves in Window, East side of Room.*

Specimens of Irish Building Stones, including marbles, limestones, granites, and porphyries.

#### DESK CASE F, AT SOUTH WINDOW.

Specimens of Building Stones from several English Quarries, including the magnesian limestone from Anston Quarry, Yorkshire, of which the Houses of Parliament are built. French limestone from Caen and Aubigny, used in this country for internal carved work. Spanish marbles, &c.

*At Side of Opening between I. and II. Rooms.*

Models for teaching Drawing from Objects.

Presented by Mr George Sharp, R.H.A., Dublin.

Tablets constructed for teaching Perspective.

Presented by Mr J. Holt, London.

### ROOM II.

#### DESK CASE A, SOUTH SIDE.

Specimens showing the Art of Wood Engraving and its Processes.

Presented by Mr R. Paterson, Edinburgh.

#### DESK CASE B, C.

Drawing and Sketch Books, Flat Examples for Object Drawing, &c.  
T. De la Rue & Co., London.

Book with Embossed Reading for the use of the Blind. W. Moon, Brighton.



OLD BUILDING—ROOM II.

Models of Crystals, Spheres, Cylinders, Cones, Pyramids, and Geometrical Figures.

Presented by Messrs Hachette & Co., London.

FLAT DESK CASE D, E.

Collection of Modern Coins and Stamps (incomplete).

Collection of Clock and Watch Movements.

Specimens of Drawing Instruments.

WALL CASE F.

Casts of Busts, Hands, Feet, &c., from the Antique; and Fruit, Foliage, &c., from nature, for Drawing Studies.

Presented by Mr D. Brucciani, 40 Russell Street, Covent Garden, London.

*In Splays of Window.*

Series of Photographs of Microscopic Objects.

Presented by Mr W. H. Olley, London.

BOOK CASE G,

Contains various Series of Educational Works published by the following Firms:—

Messrs Longman & Co., London.

Society for Promoting Christian Knowledge, London.

Messrs L. Hachette & Co., London.

Messrs Macmillan & Co., Cambridge.

Mr J. F. Borschitzky, London.

Messrs Griffith & Farran, London.

Messrs Aylott & Co., London.

Messrs W. & R. Chambers, Edinburgh.

Home and Colonial School Society, London.

Mr John Murray, London.

Mr R. Potts, Cambridge.

Messrs J. Hogg & Sons.

Messrs Cassell, Petter, & Galpin, London.

The Rev. Jno. Curwen.

Mr W. Moon, Brighton.

Messrs W. Blackwood & Sons, Edinburgh.

*On Wall above Book Case.*

Raised Maps for teaching Physical Geography, by Bauerkeller & Co., Paris.

Raised Map of England for the Blind.

Presented by Mr James Gray, Richmond Street, Edinburgh.

Rug manufactured at the Asylum for the Blind, Edinburgh, on a plan devised by Mr Thomas Campbell, 24 Richmond Street, Edinburgh.

SLOPING WALL CASE H.

Series of Colours, Drawing Apparatus and Instruments, and other Artists' Materials.

Presented by Messrs G. Rowney & Co., and Messrs Reeves & Sons, London.

*Above Wall Case.*

Series of mounted Specimens for use in Schools, illustrating the processes in tanning and dyeing Leathers.

Presented by Messrs Bevington & Sons, Cannon Street West, London.

## DESK CASE I.

Series of Geological Models to illustrate the different phenomena of stratified Rocks, and the mode in which mineral veins and coal seams occur.

Constructed by Mr T. Sopwith.

Models of India Rubber to illustrate the contortions of Rocks, and model to illustrate the False Bedding in rocks.

Constructed by Mr H. C. Sorby.

Model of Arthur's Seat, by J. R. Wright, F.G.S.

Various School Atlases.

## DESK CASE J.

Presented by Messrs W. & A. K. Johnston, Edinburgh, &c.

## WALL CASE K.

Series of Models to illustrate the native arts and manufactures of India.

Executed under the superintendence of Miss Tytler, chiefly at Patna, between 1818 and 1821, and presented by her brother, John Tytler, Esq., surgeon.

On top of Wall Case K are three specimens of Nature-Printing. Presented by Mrs Stirling of Kippenross.

*On North Screen.*

Series of Diagrams in Chromo-Lithography, to illustrate the mechanical powers, steam engines, water wheels, windmills, &c.

Presented by Messrs Hachette & Co., 18 King William Street, London.

This firm also shows some foreign Maps, which are hung on the walls.

*On South Screen.*

School Maps and Diagrams. Published by Messrs W. & A. K. Johnston, St Andrew Square, Edinburgh.

*On South Wall.*

School Maps. Published by Messrs Longman, London.

*On North Wall.*

Map showing the sites of Battlefields in England. Published by Messrs Griffith & Farran, London.

Dutch Map of Palestine.

Presented by Messrs J. Smulders & Co., The Hague.

**ROOM III.**

## IN CENTRE OF ROOM.

Model of a Paper-making Machine, one-fourth the real size.

Made by Mr George Bertram, Sciennes, Edinburgh.

The paper-making machine, of which this model represents one of the most improved modifications, was invented by a Frenchman, named Louis Robert, about the end of last century. It was first put into practical shape in England, some years later, by Messrs Fourdrinier, assisted by Bryan

Donkin. This firm bestowed several years of anxious labour, and incurred an expense of about L.60,000, in the construction of the machine. It was patented, but a technical objection to their having the patent right for more than seven years prevented their being remunerated for their outlay, and ultimately led to their bankruptcy. The introduction of Fourdrinier's machine has effected a complete revolution in the art of making paper.

Model of a Beating Engine for washing and reducing rags to pulp.

Presented by Mr Henry Bruce, Kinleith Mills, Currie.

DESK CASE, NORTH SIDE.

*Compartment A.*

Selection of Materials used for making Paper : Rag Knives, Copper-plate for pressing Wirecloth, Felt, and Deckle-strap, of the size used in the paper-making machine.

*Compartment B.*

Specimens of ordinary Writing and Printing Papers and Envelopes, of various sizes and weights. Wrapping Papers, made from straw and flax waste. Boards for Bookbinding, made of straw paper.

Presented by Messrs A. Cowan & Sons.

Papers made from various materials, as Esparto fibre, *Zostera marina*, fir wood, aloe fibre, waste silk, leathers, &c.

WALL CASE C.

Specimens of Chinese and Japanese Papers, including writing papers, wrapping papers, wall papers, papers used for dresses, pocketkerchiefs, &c.

WALL CASE D.

Sectional Models of a Corn Mill, an Organ, a Gas Metre, a Steam Engine, and a Lock, for teaching purposes.

DESK CASE E, F.

Specimens of English and Foreign Writing Papers. Tinfoil Paper.

Wire Printed Paper. Enamelled and Coloured Papers.

Specimens of Vegetable Parchment and its applications. This substance is prepared by dipping unsized paper (blotting paper) in sulphuric acid, which completely changes its nature, and gives it the strength and firmness of parchment.

Presented by Messrs De la Rue & Co., London.

CORNER WALL CASE H.

Specimens illustrating the manufacture of Papier Maché.

Presented by Messrs Halbeard & Stamps, Birmingham.

Specimens of Papier Maché, including a Tray inlaid with aluminium and mother-of-pearl.

Presented by Messrs J. Bettridge & Co., Birmingham.

SMALL DESK CASE I, IN WINDOW.

Specimens of Leather Work for stationery purposes.

Manufactured by Messrs De la Rue, London.

Specimens of Birds, Insects, &c., made of paper, displaying iridescent colours.

Presented by Mr Warren de la Rue, F.R.S.



## TABLE J, AND WALL ABOVE IT.

Series of Volumes, containing specimens of the Textile Fabrics of India; and Frame, containing illustrations of the Costumes of the People of India.

Prepared under the direction of Dr Forbes Watson, and presented by the Secretary of State for India.

## OBLONG TABLE CASE K.

Bowling Green Bowls, and specimens of Lignumvitæ, from which they are made.

Presented by Mr A. Jamieson, School of Arts, Edinburgh.

Implements for playing the Game of Croquet, made by the boys at the Wellington Reformatory, Penicuik.

Presented by the Directors of that Institution.

Illustrations of the manufacture of Fireworks.

Presented by Mr Henry Mortram, Wallworth, London.

Model of Cottage Piano Movement.

Presented by Mr J. Porter, Edinburgh.

Golf Balls formerly in use, made of buffalo hide, filled with feathers.

Presented by Mr Peter Stevenson, Edinburgh.

Small Lithographic (Autographic) Press.

*Arranged on Walls around Room.*

Large Sectional Model of Reciprocating Steam Engine.

Sectional Models of parts of various kinds of Machines.

Constructed by Messrs Rigg, Chester.

Diagrams for teachers of Physical Science. Published by Messrs Day & Son, London, and the Society for Promoting Christian Knowledge.

Flower Groups, Architectural Subjects, &c., in Chromo and Photo-Lithography.

Presented by Messrs Simonau & Toovey, Brussels.

Copies of Engravings by W. Hogarth, and Ornaments from the Vatican, in Photo-Zincography.

Presented by Sir Henry James, R.E., Southampton.

Specimens illustrating a method, called Electro-block Printing, of enlarging or reducing any print—a map, for example—by means of a sheet of India rubber.

Presented by the Electro-Printing Block Company, London.

*In Opening between Rooms III. and IV.*

Specimens illustrating Dutch Letterpress Printing. One of these specimens, printed in various kinds of type and colours, is shown in Case D. It is 90 feet long, and is perhaps the largest sheet ever printed.

Presented by Messrs J. Enschede & Son, Haarlem, Holland.

Sheet Lessons. Published by Messrs Griffith & Farran, and the Society for Promoting Christian Knowledge.

# ROOM IV.

*The Desk Cases in Centre of Floor contain—*

Specimens of Maize or Indian Corn, Wheat, Oats, and Barley. Also wax models of numerous varieties of Field and Garden Potatoes, Peas, Beans, Onions, Parsnips, and other Vegetables.

*The Wall Cases contain—*

A large series of the varieties of Wheat in the straw. Some specimens of Grasses and Clover are shown, as well as some Vegetable Seeds, chiefly in the upright Cases between windows.

# ROOM V.

*The Desk Cases in centre of Room contain—*

A series of Wax Models of the varieties of Turnips, Parsnips, Carrots, Kohl-Rabi, and Beet Root. Also a small series illustrating the malformation of roots.

*Arranged upon Table south side of Room and over Fire-place—*

Specimens of Bee Hives.

Presented by the Science and Art Department, Major Munn, and others.

*The Wall Cases contain—*

A series of specimens of Barley, Bearded Wheat, Vetches, Lathyrus, Tares, Clover, &c., in the straw.

UPRIGHT CASES BETWEEN WINDOWS.

Specimens of the Fruits and Seeds of various trees; varieties of Peas, Beans, Tares, Vetches, Lentiles, Clover, Carrot, Turnip, and other Seeds.

# ROOM VI.

*The Wall Cases contain—*

A series of specimens of Oats and Barley in the straw.

UPRIGHT CASES BETWEEN WINDOWS.

*The Upper Compartments contain—*

A series of the Agricultural Products of various European countries and British colonies.

*The Desk Compartments contain—*

A collection of Kitchen Vegetables and Flower Garden Seeds.

Presented by Messrs P. Lawson & Son, Edinburgh.

*Arranged on Stand—*

Fire Clay and Terra Cotta Vases, Ornamental Flower Pots, Propagating Glasses, and other articles for horticultural purposes.

# ROOM VII.

The specimens in this Room are not yet fully arranged. They comprise the following :—



Specimens of Wools, arranged in different cases, including—  
Varieties of Merino Wool, from Moravia, Bohemia, and Silesia.

Presented by the Austrian Commission for the International Exhibition of 1862.

Specimens of Hungarian Sheeps' Wool.

Presented by Dr Joseph Szabo, Pesth.

Specimens of Wools from Tasmania.

Presented by the Tasmanian Commission for the International Exhibition of 1862.

Wools from various countries.

Presented by Messrs T. & H. Littledale & Co., Liverpool.

Specimens of Home-grown Wool.

Presented by Mr Robert Girdwood, Edinburgh.

#### SMALL WALL CASE, SOUTH END.

Contains illustrations of Ravages in British Forests by Insects.

#### SMALL WALL CASE, NORTH END.

Contains a collection of specimens, made by Dr Eugene Robert of Bellevue, France, to illustrate the injuries caused in the Elm and other trees by various insects, and the effect of his method of cure by partial removal of the bark, and dressing with some fluid destructive to insects.

#### *Arranged on the projecting portion in centre of Room.*

Group of useful Products, representing a peculiar industry begun and carried out by M. Leopold Javal, Deputy of the French Empire.

It consists in reclaiming and rendering productive the wastes of moving sands called "Landes," in the department of Gironde, and other parts near the sea-coast. The operations are commenced by planting seedlings of the cluster pine (*Pinus pinaster*), the (*Pin maritime*) of the French, in narrow belts across the sand, and sheltering them by hurdles made of rushes and twigs. This species of pine thrives well in such situations, and soon becomes strong enough to resist the winds. In this way living fences are raised, and the sands inclosed in squares, the lines of young trees intersecting each other. These inclosures are then sown with rape, mustard, and other rapid-growing crops, advantage being taken of wet weather, and after the seeds of these plants are saved the rest of the crop is ploughed in, and helps to form vegetable mould. This is repeated until sufficient has accumulated to support grain and other crops.

Presented by M. Leopold Javal, Deputy of France.

#### *The following Models are placed in this Room :—*

Model of a Sheep-Washing Pool.

Designed by Mr G. Simson, Courthill, near Kelso.

Model of a Windmill. (Univ. Coll.)

Model of a Russian Barn.

Model of a Russian House for drying grain.

Model of a Russian Linseed Sorter.



*On Screen at the north end of Room there are placed—*

A series of coloured Maps illustrating the agricultural products of Russia.

There are also shown here some specimens of Woods belonging to series in Room I.

### ROOM VIII., at Bottom of Stair.

#### AGRICULTURAL IMPLEMENTS.

Model of a Flour Mill with water-wheel. (Univ. Coll.)

Model of an Oil-Cake Crusher and Grinding Mill. (Univ. Coll.)

Models of Steaming Apparatus for preparing food for horses and cattle. (Univ. Coll.)

Model of a Saw Mill. (Univ. Coll.)

Model of a Farm Steading. (Univ. Coll.)

Models of Cottages.

Models of Peat Compressers.

### ROOM IX.

#### WALL CASE A.

Contains models of Straw and Turnip Cutters.

#### OBLONG CASE B.

Contains models of Fanners, Barrows, Rakes, Irrigating Machine, &c.

#### *On Top of Case.*

Models of Field Gates.

#### TABLE C.

Models of Reaping Machines.

#### WALL CASE D, AND SHELVES ADJOINING.

Models of Cheese Presses, Churns, Milk Dishes, &c.

#### CENTRE TABLE E.

Models of various kinds of Carts. Some of these are also placed in the windows. Under the Table two models of Cart-weighing Machines are placed.

#### *At End of Table.*

Model of a Steam Engine.

#### SOUTH SIDE OF ROOM.

Large model of a Scotch Thrashing Mill driven by horse power.

Models of Hand Thrashing Machine, of a Thrashing Mill Shaker, of a Whin Cutter, and of a Water Mill.

#### *On the Walls are hung—*

Specimens of Agricultural Tools.

### ROOM X.

#### *North Wall Case A contains—*

Models of various kinds of Ploughs.

*East Wall Case, Compartment B, contains—*

Models of Agricultural Tools.

Manufactured by Messrs J. Yates &amp; Co., and Messrs Parkes &amp; Palmer, Birmingham.

Models of Felling Saws.

*Compartment C contains—*

Models of various kinds of Harrows.

*On Top of Wall Case.*

Models of small Bridges.

*Oblong Case D in Recess contains—*

Models of various kinds of Grubbers.

*On Centre Table E.*

Models of Sowing Machines.

*On Table and Shelf at Window.*

Model of a portion of a Ploughed Field.

Models of Field Rollers.

Model of a Pile-driving Machine.

Specimens of Manures.

Models of Bone-crushing Mills.

*Upon the Walls are arranged—*

Specimens of Draining and other Tools.

The greater portion of the Agricultural Collection formerly constituted the Museum of the Highland and Agricultural Society, and was by that institution presented to this Museum. In addition to this is the University Agricultural Collection, presented by the Senatus Academicus, through Jno. Wilson, Esq., Professor of Agriculture.